

**OPERATOR, ORGANIZATIONAL, FIELD, AND
DEPOT MAINTENANCE MANUAL**

**WELDING SET, ARC, INERT GAS SHIELDED:
PLASTIC OR METAL LINED GUN; FOR
3/64 IN. WIRE; DC, 115V (LINDE MODEL
SWM-9-A) FSN 3431-972-7672**

This copy is a reprint which includes current
pages from Change 2 .

**HEADQUARTERS, DEPARTMENT OF THE ARMY
JULY 1963**

SAFETY PRECAUTIONS

BEFORE OPERATION

See that all electrical power is disconnected before performing maintenance on the welding set. Failure to observe this warning can result in serious injury to personnel.

Do not set up the welding set in an area where toxic or flammable fumes are present.

DURING OPERATION

Do not attempt to weld unless a welding helmet and leather gloves are worn and the skin is completely covered. A helmet equipped with a No. 10 glass should be used for currents of 75 to 2000 amperes. Light-weight leather clothing is preferred; but if leather is not available, heavy, dark colored clothing may be utilized.

Performing any field expedient repair creates a condition possibly dangerous to personnel or equipment. A welding set so repaired should be taken out of service as soon as possible for replacement of defective parts.

When malfunction of the selenium rectifier occurs, thoroughly ventilate the rectifier to avoid inhalation of poisonous fumes. Do not handle the damaged rectifier. Selenium compound can be absorbed through the skin, especially when hot. Failure to observe this warning can result in severe injury or death.

AFTER OPERATION

See that all electrical power is disconnected before performing maintenance on the welding set. Failure to observe this warning can result in serious injury to personnel.

Lye is caustic. If lye should come in contact with the body, wash repeatedly with water. Should it come in contact with the eyes, flush the eyes with boric acid.

CHANGE

No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C. 7 December 1972

**Operator, Organizational, Direct Support, General
Support, and Depot Maintenance Manual
WELDING SET, ARC; INERT GAS SHIELDED;
PLASTIC OR METAL LINED GUN FOR 3/64
IN. WIRE; DC, 115V, (LINDE MODEL
SWM-9-A) FSN 3431-972-7672**

TM 5-3431-208-15, 8 July 1963 is changed to read as follows:

The title is changed as shown above.

Page 2. Paragraph 1d is superseded as follows:

d. You can improve this manual by calling attention to errors and by recommending improvements, by using DA Form 2028 (Recom-

mended Changes to Publications) or by a letter, and mail directly to Commander, U. S. Army Mobility Equipment Command, ATTN: AMSME-MPP, St. Louis, MO., 63120. Mobility Equipment Command, ATTN: AMSME-MPP, St. Louis, MO., 63120. A reply will be furnished directly to you.

Page 54. Appendix III is superseded as follows:

**APPENDIX III
BASIC ISSUE ITEMS LIST AND ITEMS
TROOP INSTALLED OR AUTHORIZED**

Section 1. INTRODUCTION

1. Scope

This appendix lists items required by the operator for operation of the welding set.

2. General

This list is divided into the following sections:

a. *Basic Issue Items List—Section II.* applicable.

b. *Items Troop Installed or Authorized List—Section III.*

A list of items in alphabetical sequence, which at the discretion of the unit commander may accompany the welding set. These items are NOT SUBJECT TO TURN-IN with the welding set when evacuated.

3. Explanation of Columns

The following provides an explanation of columns in the tabular list of Basic Issue Items

List, Section II, and Items Troop Installed or Authorized, Section III.

a. *Source, Maintenance, and Recoverability Code (SMR).* Not applicable.

b. *Federal Stock Number.* This column indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. *Description.* This column indicates the Federal item name and any additional description of the item required.

d. *Unit of Measure (UIM).* A two character alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based, e.g., ft, ea, pr, etc.

e. *Quantity Furnished with Equipment (BIIL).* Not applicable.

f. *Quantity Authorized (Items Troop Installed or Authorized).*

This column indicates the quantity of the item authorized to be used with the equipment.

Section III. ITEMS TROOP INSTALLED OR AUTHORIZED LIST

(1) SMR Code	(2) Federal Stock Number	(3) Description Ref No. & Mfr Code Usable on code	(4) Unit of mess	(5) Qty Auth
	7520-559-9618	CASE, Maintenance and Operation manual	EA	1

By Order of the Secretary of the Army:

Official:

VERNE L. BOWERS,
Major General, United States Army,
The Adjutant General.

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Distribution:

To be distributed in accordance with DA Form 12-25A (qty rqr block No. 182) organizational maintenance requirements for Welding.

Operator, Organizational, Field, and Depot Maintenance Manual**WELDING SET, ARC, INERT GAS SHIELDED: PLASTIC OR METAL LINED GUN;
FOR 3/64 IN. WIRE; DC, 115 V (LINDE MODEL SWM-9-A) FSN 3431-972-7672**

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CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope

a. These instructions are published for the use of the personnel to whom the Linde Model SWM-9-A Welding Set is issued. Chapters 1 through 5 provide information on the operation, daily preventive maintenance services, and organizational maintenance of the equipment, accessories, components, and attachments. Chapter 6 provides information for field and depot maintenance (3d, 4th, and 5th echelons). This manual also provides descriptions of the main units and their functions in relationship to other components.

b. Appendix I contains a list of publications applicable to this manual. Appendix II contains the maintenance allocation chart. Appendix III contains the list of basic issue items and the maintenance and operating supplies authorized the operator of this equipment. The organizational, field, and depot maintenance repair parts and special tool lists are listed in TM 5-3431-208-25P.

c. Numbers in parentheses on illustrations indicate quantity. Numbers preceding nomen-

clature callouts on illustrations indicate the preferred maintenance sequence.

d. Report all deficiencies in this manual on DA Form 2028 (Recommended Changes to DA Technical Manual Parts Lists or Supply Manual 7, 8 or 9). Submit recommendations for changes, additions, or deletions to the Commanding Officer, U. S. Army Mobility Support Center, ATTN: SMOMS-MS, P. O. Box 119, Columbus 16, Ohio. Direct communication is authorized.

e. Report all equipment improvement recommendations as prescribed in TM 38-750.

2. Record and Report Forms

For record and report forms applicable to the operator, crew, and organizational maintenance, refer to TM 38-750.

Note. Applicable forms, excluding Standard Form 461 (United States Government Motor Vehicle Operator's Identification Card), which is carried by the operator, will be kept in a canvas bag mounted on the equipment.

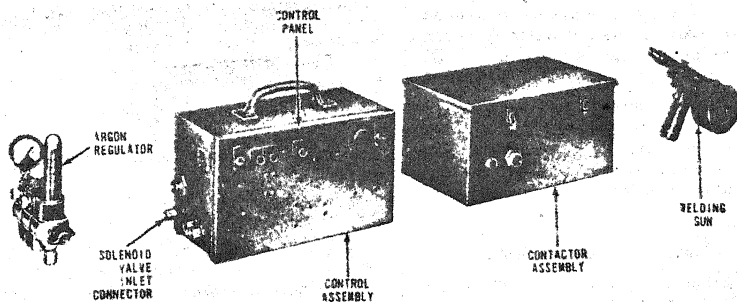
Section II. DESCRIPTION AND DATA

3. Description

a. *General.* The Linde Welding Set, Model SWM-9-A, (figs. 1 and 2) is designed for continuous duty, semiautomatic welding of aluminum, using a consumable aluminum wire electrode shielded by inert argon gas. The welding set can be used for either short arc welding, with a constant-potential power supply, or conventional welding, with a constant-current power supply. The welding set consists of a control assembly, contractor assembly, welding gun, argon gas regulator, and the necessary hoses and cables.

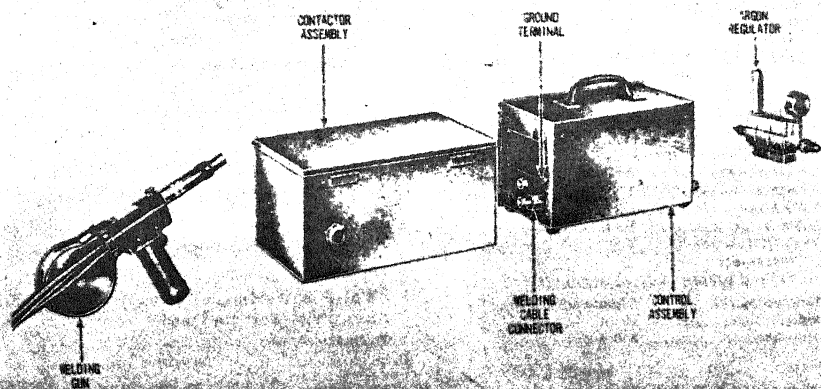
b. *Control Assembly.* The control assembly (fig. 1) is a lightweight metal box containing the argon gas solenoid valve, current relay, welding cable connector, terminal board, and necessary wiring. Mounted on the control panel (fig. 1) are the fuses, switches, resistors, relays, rectifier, and wiring necessary for proper operation and control of the welding set.

c. *Welding Gun.* The welding gun (fig. 1) is an air-cooled spool-on-gun, hand welding torch, rated for a maximum current capacity of 200 amperes dc (direct current) continuous duty. It will provide the full range of wire feed



MSC 3431-200-15/1

Figure 1. Welding set, right front, three quarter view.



MSC 3431-200-15/2

Figure 2. Welding set, left rear, three quarter view.

speeds required to handle all welding applications, using $\frac{3}{16}$ -inch diameter aluminum wire.

d. *Contactor Assembly.* The contactor assembly (fig. 1) is a lightweight metal box containing the welding circuit contactor. This contactor serves as a circuit interrupter for the welding circuit.

e. *Argon Gas Regulator.* The argon gas regulator (fig. 1) is a two stage, constant flow regulator equipped with a pressure gage and flowmeter. The regulator is used to control the amount of argon gas flowing from the welding gun.

4. Identification and Tabulated Data

a. *Identification.* The welding set has a Corps of Engineers identification plate located on the left side of the control assembly. This plate specifies nomenclature, make, model, and serial numbers, volts, amps, and cycles.

b. *Tabulated Data.*

(1) *Corps of Engineers identification plate.*

Nomenclature	Welding set, inert gas shielded arc, metal electrode
Make	Linde Co.
Model	SWM-9-A
Serial	
Volts	115 v, ac-dc (volts, alternating current—direct current)
Ampers	10
Cycles	60

(2) *Solenoid valve.*

Manufacturer	Automatic Switch Co.
Voltage	110 v, dc
Wattage	10
Orifice	$\frac{3}{16}$ in. (inch)
Psi (pounds per square inch).	20

(3) *Welding control rheostat.*

Manufacturer	Ohmite Mfg. Co.
Model	H
Insulation	300 v

Ohms	75
Watts	25

(4) *Rectifier.*

Manufacturer	ITT Components Division
Type	Selenium, full-wave bridge
Voltage input	115 v, ac

(2) *Weld contactor.*

Manufacturer	Square D Co.
Type	VO-11
Maximum operating voltage.	128 v, dc
Action	Single-pole-single-throw

(6) *Trigger switch.*

Manufacturer	Micro Switch Corp.
Type	Subminiature
Volts	30
Ampers	$2\frac{1}{2}$
Action	Single-pole-double-throw

(7) *Inching switch.*

Manufacturer	Hetherington Co.
Type	C41005
Volts	24 dc
Ampers	17
Action	Single-pole-double-throw

(8) *Argon regulator.*

Manufacturer	Linde Co.
Type	R-502
Flow	Constant

(2) *Dimensions and weight (crated)*

Length	27 $\frac{1}{2}$ in.
Width	20 in.
Height	22 $\frac{1}{2}$ in.
Weight	186 lb (pound)

(10) *Wiring diagram.* For a practical wiring diagram of the welding set, refer to figure 3.

Figure 3. Practical wiring diagram.

(Located in back of Manual)

5. Difference in Models

This manual covers only the Linde Model SWM-9-A Welding set. No known unit differences exist for the model covered by this manual.

CHAPTER 2

INSTALLATION AND OPERATION INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

6. Unloading Equipment

- a. Remove all blocking and tiedowns that secure the unit to the bed of the carrier.
- b. The crated unit may be removed from the carrier by manpower or forklift truck.

7. Unpacking Equipment

- a. *General.* The welding unit is shipped in a wooden crate.
- b. *Unpacking.*
 - (1) Remove all metal banding from around the crate.
 - (2) Remove the lid from the crate and remove the welding set.

Caution: Exercise care not to damage the equipment when using such tools as prybars to open the shipping crate.

- (3) Check the equipment against the packing list to make sure all equipment listed has been received.

8. Inspecting and Servicing Equipment

a. *Inspection.*

- (1) Inspect the entire welding set for cracks, breaks, corrosion, loose or missing mounting hardware, and damaged electrical wiring.
- (2) Correct or report all deficiencies to field maintenance.

b. *Servicing.* Perform the daily preventive maintenance services (par. 29).

9. Installation of Separately Packed Components

The argon regulator, welding gun, welding wire, and all cables and hoses are packed separately.

Refer to paragraph 10 for installation of these items.

10. Installation or Setting-Up Instructions

a. *Location.* Locate the welding set as close as possible to the work so that the control assembly is close at hand. Approximately 50 feet of hose and cable are supplied with the welding gun; therefore, it will be necessary to exercise care in positioning the hose so that it is free of kinks and sharp bends. If possible, try to locate the set in an area that will afford some shielding to protect the eyes of personnel working in the same area.

Warning: Do not set up the welding set in an area where toxic or flammable fumes are present.

Caution: Always position the control assembly upright. Laying the control assembly on its back will cause the current relay to close and welding wire will feed at inching speed.

b. *Electrical Cables.* When the welding set is received new, all cables and hoses, except those attached to the welding gun, are disconnected and packed separately. To install these items, refer to the wiring diagrams (figs. 3 and 27) and install as follows:

- (1) *Welding gun power cable.* Connect the welding cable to the welding cable connector (fig. 2) and position the boot over the connection.
- (2) *Welding gun ground cable.* Connect the ground cable to the control assembly ground terminal (fig. 2).
- (3) *Welding gun switch cable.* Pass the switch cable through the strain relief connector and secure to the control assembly terminal board (T1). Tighten the connector.

- (4) *Work pickup cable.* Pass the pickup cable through the strain relief connector and connect to the control assembly terminal board (T1). Tighten the connector.
- (5) *Contactor cable.* Pass the contactor cable through the strain relief connector and connect to the weld start relay RA and auxiliary weld start relay RB. Pass the other end of the contactor cable through the strain relief connector and connect to the contactor assembly terminal board (T2). Tighten the connectors.
- (6) *12½-ft welding cable.* Pass the welding cable through the strain relief connector, through the center of the current relay RC, and connect to the welding cable connector adapter. Pass the other end of the welding cable through the strain relief connector and connect to the negative terminal of the weld contactor WC. Tighten the connectors.
- (7) *115-volt supply cable.* Pass the supply cable through the strain relief connector and connect to the control assembly terminal board (T1) and line switch S1. Tighten the connector. Connect the other end of the supply cable to a source of 115-volts, ac or dc.

- (8) *6-ft welding cable.* Pass the welding cable through the strain relief connector and secure to the positive terminal of the weld contactor WC. Tighten the connector. Secure the other end of the welding cable to the positive terminal of the welding power supply.

Caution: Do not connect the welding set to a high-frequency power source. Damage to the welding set will result.

- (9) *Ground weld cable.* See that a ground weld cable is connected to the negative terminal of the welding power supply.

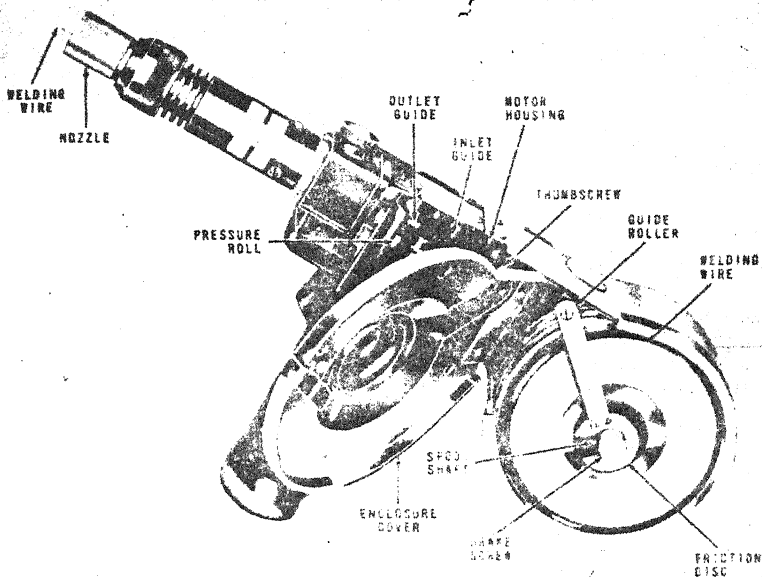
c. Argon Regulator and Hose.

- (1) Connect the argon regulator (fig. 1) to a suitable source of argon gas. Make sure the flow-adjusting valve is off by turning the handle to the extreme clockwise position.

Note. When handling the argon regulator, do not grasp the regulator by the flowmeter tube guard. Hold the regulator in the palm of the hand. Make sure the regulator is installed with the flowmeter upright.

- (2) Connect the argon hose to the regulator and to the solenoid valve inlet connector (fig. 1).

d. Loading the Welding Gun. Refer to figure 4 and load the welding gun.



- STEP 1. LOOSEN THUMBSCREW AND SWING PRESSURE ROLL AWAY FROM MOTOR HOUSING.
 - STEP 2. OPEN ENCLOSURE COVER, LOOSEN BRAKE SCREW, AND POSITION FRICTION DISC AWAY FROM SPOOL SHAFT.
 - STEP 3. POSITION WELDING WIRE ON SPOOL SHAFT SO THAT WIRE FEED IS IN COUNTERCLOCKWISE DIRECTION. FEED WIRE UNDER GUIDE ROLLER AND THROUGH INLET AND OUTLET WIRE GUIDES UNTIL APPROXIMATELY 1 INCH OF WIRE PROTRUDES FROM NOZZLE.
 - STEP 4. ENGAGE FRICTION DISC AND TIGHTEN BRAKE SCREW ENOUGH TO PREVENT WELDING WIRE FROM UNWINDING.
 - STEP 5. SWING PRESSURE ROLL INTO POSITION AND TIGHTEN THUMBSCREW UNTIL POSITIVE LOADING IS APPLIED ON WELDING WIRE AND DRIVE ROLL.
 - STEP 6. CLOSE ENCLOSURE COVER.
- NOTE: IT MAY BE NECESSARY TO READJUST PRESSURE ROLL AND FRICTION DISC TO OBTAIN PROPER WIRE FEED WHEN WELDING BEGINS.

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Figure 4. Welding gun loading instructions.

Section II. MOVEMENT TO A NEW WORKSITE

11. Dismantling for Movement

a. *Cables.* Disconnect the 6-foot welding cable and welding ground cable from the welding power source. Coil the cables for ease of handling.

b. *Argon Regulator.* Disconnect the argon regulator from the argon hose and from the source of supply. If the welding set is to be moved a long distance, pack the regulator to prevent damage during movement.

c. *Movement.* The welding set may be hand-carried if movement to a new worksite is only a short distance. If movement is to be a long distance, stow the welding set in a shipping crate for ease of handling and to prevent damage during movement.

12. Reinstallation After Movement

Install the welding set at the new worksite as instructed in paragraph 10.

Section III. CONTROLS AND INSTRUMENTS

13. General

This section describes, locates, illustrates, and furnishes the operator, crew, or organizational maintenance personnel sufficient information about the various controls and instruments for proper operation of the welding set.

14. Controls and Instruments

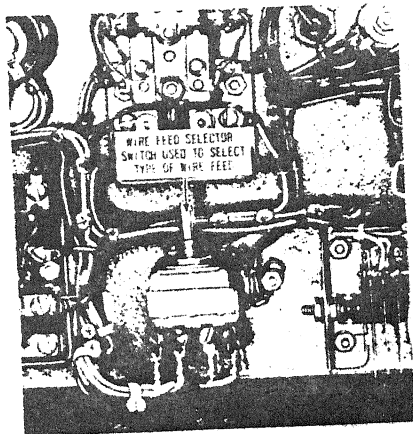
The purpose and location of all controls and instruments are shown in figure 5.

ARGON PRESSURE GAGE INDICATES
PRESSURE OF ARGON ENTERING REGULATOR

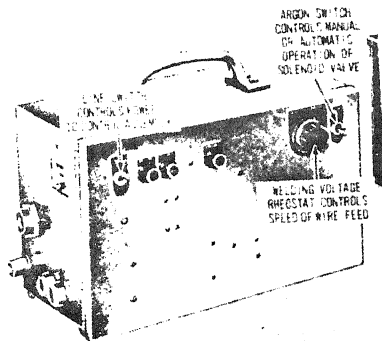
ARGON FLOWMETER
INDICATES AMOUNT
OF ARGON FLOW

ADJUSTING VALVE
ADJUSTS FLOW OF
ARGON

A ARGON PRESSURE GAGE FLOWMETER
AND ADJUSTING VALVE



B WIRE FEED SELECTOR SWITCH



C. LINE SWITCH ARGON SWITCH, AND WELDING VOLTAGE RHEOSTAT.

TRIGGER SWITCH
CONTROLS ARGON
FLOW WIRE FEED
AND WELDING POWER

INCHING SWITCH
CONTROLS WIRE FEED
(INOPERATIVE WHEN
TRIGGER IS DEPRESSED)

D TRIGGER AND INCHING SWITCH

NSC 3431-208-15/5

Figure 5. Controls and instruments.

Section IV. OPERATION OF EQUIPMENT

15. General

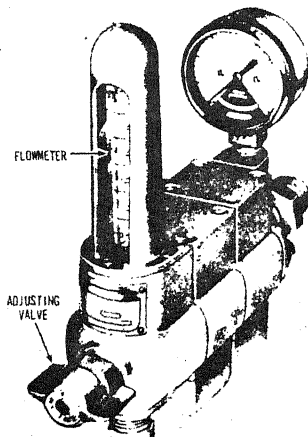
a. The instructions in this section are published for the information and guidance of the personnel for the operation of the welding set.

b. The operator must know how to perform every operation of which the welding set is capable. This section gives instructions on starting and stopping the welding set. Since nearly every job presents a different problem, the operator may have to vary given procedures to fit the individual job.

16. Starting

a. Preparation for Starting.

- (1) Connect the ground weld cable to the work.



- STEP 1 SEE THAT ADJUSTING VALVE IS IN EXTREME CLOCKWISE POSITION.
- STEP 2 PLACE LINE SWITCH IN **ON** POSITION.
- STEP 3 PLACE ARGON SWITCH IN **MAN** POSITION.
- STEP 4 TURN ADJUSTING VALVE COUNTERCLOCKWISE UNTIL FLOWMETER INDICATES APPROXIMATELY 35 CFH (CUBIC FEET PER HOUR).
NOTE: ALWAYS TAKE FLOWMETER READING ACROSS THE TOP OF THE BALL FLOAT.
- STEP 5 PLACE ARGON SWITCH IN **AUTO** POSITION.
- STEP 6 PLACE LINE SWITCH IN **OFF** POSITION.

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Figure 6. Argon regulator flow adjustment.

- (2) Connect the work pickup cable to the work.

- (3) Refer to figure 6 and adjust the argon regulator to the desired flow rate.

b. Starting.

- (1) *General.* The welding set can be utilized for either standard (constant current) or short arc (constant potential) operation. When the wire feed selector switch is placed in the **CP** position (short arc), the wire feed rate is controlled by regulating the current with the welding control rheostat. When the wire feed selector switch is placed in the **STD** (constant current), the wire feed rate is controlled by the welding control rheostat plus the voltage drop across the arc.

- (2) *Starting.* Refer to figure 7 for starting instructions.

Warning: Do not attempt to weld unless a welding helmet and leather gloves are worn and the skin is completely covered. A helmet equipped with a No. 10 glass should be used for currents of 75 to 200 amperes. Lightweight leather clothing is preferred; but if leather is not available, heavy, dark-colored clothing may be utilized.

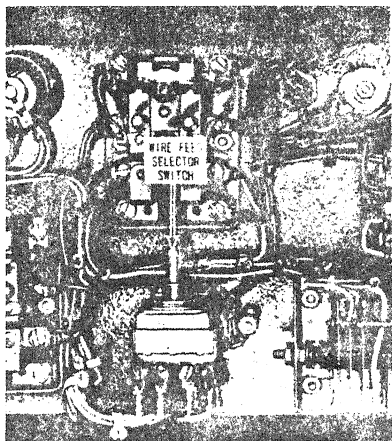
17. Stopping

Refer to figure 8 for welding set stopping instructions.

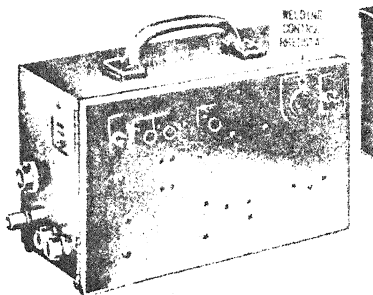
18. Welding Set Operation

When welding is started, the welding control rheostat and the argon flow adjusting valve may be incorrectly adjusted, causing the welding wire to stub and the weld to oxidize. In this event, adjust the rheostat and argon regulator until the proper arc length is obtained and the weld is good. The proper arc length of the welding wire is usually obtained when the cracking sound of the arc diminishes.

Note. The welding set is equipped with a protective circuit which will shut down the set if the welding arc becomes excessively long.

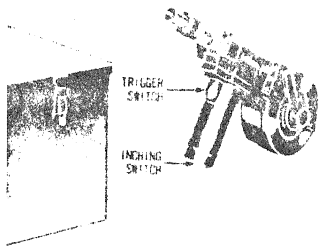


STEP 1. PLACE WIRE FEED SELECTOR SWITCH IN STD OR CP POSITION AS DESIRED.



NOTE: TO INCREASE WIRE FEED RATE TURN RHEOSTAT CLOCKWISE WITH SELECTOR SWITCH IN CP BUT COUNTERCLOCKWISE WITH SELECTOR SWITCH IN STD.

STEP 2. TURN WELDING CONTROL RHEOSTAT TO MIDRANGE



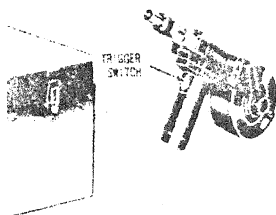
STEP 3. IF NECESSARY, DEPRESS INCHING SWITCH UNTIL WIRE PROTRUDES 1 INCH FROM NOZZLE.

STEP 4. SIMULTANEOUSLY, DEPRESS TRIGGER SWITCH AND TOUCH WELDING WIRE TO WORK PIECE.

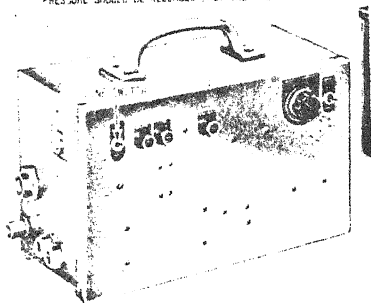
MSC 3431-208-15/7

Figure 7. Welding set starting instructions.

NOTE: IF SET IS TO BE INOPERATIVE LONGER THAN 30 MINUTES, ALL PRESSURE SHOULD BE RELEASED FROM THE ARGON REGULATOR.



STEP 1. RELEASE TRIGGER SWITCH



STEP 2. PLACE LINE SWITCH IN OFF POSITION.

MSC 3431-208-15/8

Figure 8. Welding set stopping instructions.

19. Operation in Extreme Cold (Below 0°F.)

The welding set is designed for use outdoors and will operate satisfactorily in temperatures as low as -25°F. However, during cold-weather operation, it will be necessary to avoid excessive handling of hoses and cables, since hoses and cable insulation becomes brittle with extreme cold.

20. Operation in Extreme Heat

The welding set is designed to operate in temperature as high as 125°F. without damage to the unit. However, proper ventilation should be provided to aid in cooling and to protect the operator against toxic fumes.

21. Operation in Dusty or Sandy Areas

When operating in sandy or dusty areas, locate the welding set so as to take advantage of natural barriers that will protect the unit from blowing dust or sand. Keep the welding gun free of dust and sand as possible. The welding gun is equipped with nylon components that

may cause improper wire feed should dust or sand be allowed to enter the gun. Inspect the gas ports of the welding gun to insure proper gas flow. Provide a protective covering for the welding set when it is not in use.

22. Operation Under Rainy or Humid Conditions

When operating the welding set under rainy conditions, protect the work and the welding set as much as possible. Wipe all exposed surfaces frequently. When it is not in use, cover the unit with a waterproof cover. During dry periods, open the doors on the control and assembly and contactor assembly and allow the electrical components to dry.

23. Operation in Salt-Water Areas

a. *General.* Salt water causes a corrosive action on metal. Care must be taken to avoid contact of equipment with salt water. If contact is made, or if the unit is exposed to salt spray, wash the unit frequently with fresh, clean water.

b. Painting. Paint all exposed metal surfaces. If paint is not available, coat exposed surfaces with a light coat of grease.

c. Electrical Connections. Inspect all electrical connections and contact points frequently

for corrosion caused by salt air. Remove all corrosion from connections and contacts.

24. Operation at High Altitudes

High altitudes will not affect the operating efficiency of the welding set.

CHAPTER 3

OPERATOR AND ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. OPERATOR AND ORGANIZATIONAL MAINTENANCE TOOLS AND EQUIPMENT

25. Special Tools and Equipment

No special tools or equipment are required by the operator or organizational maintenance personnel for the maintenance of this welding set.

26. Basic Issue Tools and Equipment

Tools and repair parts issued with or author-

ized for the welding set are listed in the basic issue item list, appendix III.

27. Organizational Maintenance Repair Parts

Organizational maintenance repair parts are listed and illustrated in TM 5-3431-208-25P.

Section II. PREVENTIVE MAINTENANCE SERVICES

28. General

To insure that the welding set is ready for operation at all times, it must be inspected systematically, so that defects may be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance services to be performed are listed and described in paragraphs 29 and 30. The item numbers indicate the sequence of minimum inspection requirements. Defects discovered during operation of the unit will be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noted during operation which would damage the equipment if operation were continued. All deficiencies and shortcomings will be recorded, together with the corrective action taken, on DA Form 2404 (Equipment Inspection and Maintenance Worksheet) at the earliest possible opportunity.

29. Daily Preventive Maintenance Services

This paragraph contains an illustrated tabulated listing of preventive maintenance services which must be performed by the operator. The item numbers are listed consecutively and indicate the sequence of minimum requirements. Refer to figure 9 for the daily preventive maintenance services.

30. Quarterly Preventive Maintenance Services

a. This paragraph contains an illustrated tabulated listing of preventive maintenance services which must be performed by organizational maintenance personnel at quarterly intervals. A quarterly interval is equal to 3 calendar months, or 250 hours of operation, whichever occurs first.

b. The item numbers are listed consecutively and indicate the sequence of minimum requirements. Refer to figure 10 for the quarterly preventive maintenance services.

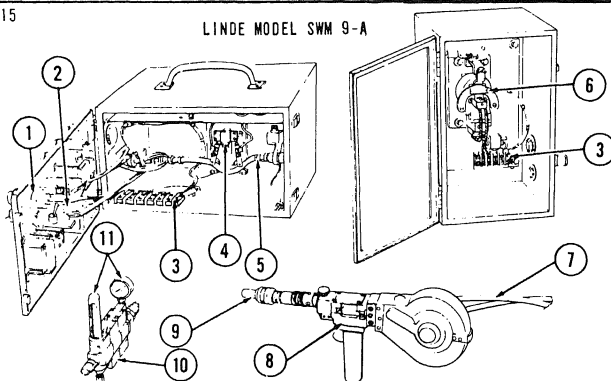
PREVENTIVE MAINTENANCE SERVICES

DAILY

TN5-3431-208-15

LINDE MODEL SWM 9-A

WELDER



LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

ITEM		PAR REF
1	<u>RESISTOR.</u> Check for damage and loose connections.	
2	<u>RECTIFIER.</u> Check for damage and loose connections.	
3	<u>TERMINAL STRIP.</u> Check for loose connections.	
4	<u>WELDING CURRENT RELAY.</u> Check for loose connections. Check for burnt or pitted contacts.	
5	<u>GAS HOSE ASSEMBLY.</u> Check for cracks, breaks, and leaks.	
6	<u>CONTACTOR.</u> Check for loose connections and burned, or pitted contacts.	
7	<u>CABLES.</u> Check for breaks, frayed insulation, and deterioration.	
8	<u>PRESSURE ROLL ASSEMBLY AND FEED ROLL.</u> Check for damage and build up of welding wire.	
9	<u>NOZZLE.</u> Check for spatter, burned or clogged condition.	
10	<u>REGULATOR.</u> Check for damage and leaks.	

Figure 9. Daily preventive maintenance services.

ITEM		PAR REF
11	<p><u>CONTROLS AND INSTRUMENTS.</u> Check the controls and instruments for damage. With the unit operating check for proper operation.</p> <p>Flowmeter. Indicates amount of argon gas flowing to torch.</p> <p>Pressure gage. Indicates argon gas pressure in tank.</p>	
	<p><u>NOTE 1. OPERATION.</u> During operation observe for any unusual noise or vibration.</p>	

MSC 3431-208-15/9

Figure 9—Continued.

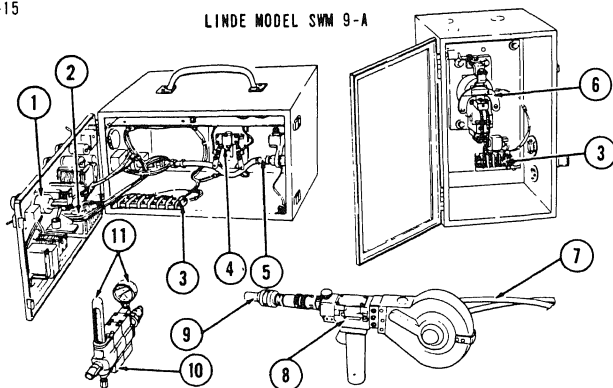
PREVENTIVE MAINTENANCE SERVICES

QUARTERLY

TW5-3431-208-15

LINDE MODEL SWM 9-A

WELDER



LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

ITEM

PAR REF

1	<u>RESISTOR.</u> Replace a damaged resistor. Tighten loose connections.	57 58 59
2	<u>RECTIFIER.</u> Replace a damaged rectifier. Tighten loose connections.	56
3	<u>TERMINAL STRIP.</u> Tighten loose connections.	
4	<u>WELDING CURRENT RELAY.</u> Tighten loose connections. Replace excessively burned or pitted contacts.	62
5	<u>GAS HOSE ASSEMBLY.</u> Replace a cracked, broken, or leaking hose assembly.	44
6	<u>CONTACTOR.</u> Tighten loose connections. Replace excessively burned or pitted contacts.	65
7	<u>CABLES.</u> Replace cracked, broken, frayed, or deteriorated cables.	68
8	<u>PRESSURE ROLL AND FEED ROLL.</u> Replace damaged rolls. Clean build up of welding wire from rolls.	32 75
9	<u>NOZZLE.</u> Clean all spatter from nozzle. Replace a burned nozzle.	72

Figure 10. Quarterly preventive maintenance services.

ITEM		PAR REF
10	<u>REGULATOR.</u> Replace a damaged or leaking regulator.	46
11	<u>CONTROLS AND INSTRUMENTS.</u> Check the controls and instruments for damage. With the unit operating check for proper operation. Flowmeter. Indicates amount of argon gas flowing to torch. Pressure gage. Indicates argon gas pressure in tank.	
	<u>NOTE 1. OPERATIONAL TEST.</u> During operation observe for any unusual noise or vibration.	
	<u>NOTE 2. ADJUSTMENTS.</u> Make all necessary adjustments during operational test.	

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Figure 10—Continued.

31. Fuses, F1, F2, F3

a. *Removal.* Refer to figure 11 and remove the fuses.

b. *Cleaning and Inspection.*

- (1) Wipe the fuse free of all dirt and grease.
- (2) Inspect the fuse for cracks, breaks, and broken filament.
- (3) Replace a defective fuse.

c. *Installation.* Refer to figure 11 and install the fuses.

32. Welding Gun Service

Refer to figure 12 and service the welding gun.

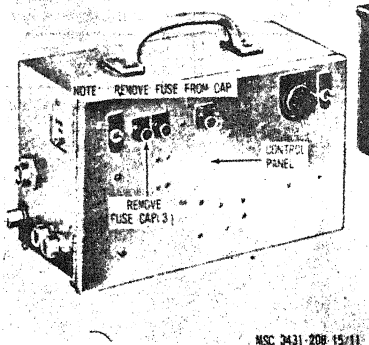
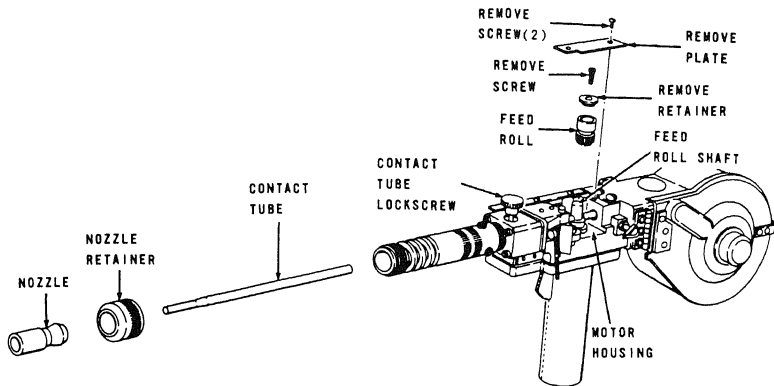


Figure 11. Fuses, removal and installation.



NOZZLE AND CONTACT TUBE:

LOOSEN NOZZLE RETAINER AND REMOVE NOZZLE. LOOSEN CONTACT TUBE LOCKSCREW AND REMOVE CONTACT TUBE. REMOVE SPATTER FROM NOZZLE AND CONTACT TUBE, USING FILE OR HAND REAMER.

FEED ROLL:

REMOVE FEED ROLL AS SHOWN ABOVE. REMOVE ALUMINUM RESIDUE FROM FEED ROLL, USING STIFF BRISTLE BRUSH. REMOVE ALL METAL PARTICLES FROM IN AND AROUND MOTOR HOUSING.

NOTE:

IT MAY BE NECESSARY TO SOAK FEED ROLL IN LYE WATER TO REMOVE ALUMINUM FROM GROOVES. USE TWO TEASPOONFULS OF LYE PER ONE PINT OF WATER. ALLOW TO SOAK APPROXIMATELY ONE MINUTE.

WARNING:

LYE IS CAUSTIC. IF LYE SHOULD COME IN CONTACT WITH THE BODY, WASH REPEATEDLY WITH WATER. SHOULD IT COME IN CONTACT WITH THE EYES, FLUSH EYES WITH BORIC ACID.

MSC 3431-208-15/12

Figure 12. Welding gun servicing instructions.

Section IV. TROUBLESHOOTING

33. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the welding set and its components. Each trouble symptom stated is

followed by a list of probable causes of the trouble. The possible remedy recommended is described opposite the probable cause. Any trouble beyond the scope of organizational maintenance will be reported to field maintenance, 3d echelon.

34. Welding Gun Will Not Start an Arc

<i>Probable cause</i>	<i>Possible remedy</i>
Line switch in off position	Place line switch in on position.
Ground connection inadequate on welding ground cable	Secure ground connection.
Fuse (F1 or F2) defective	Replace fuse (par. 31).
Contactor coil or contact points defective	Replace or repair contactor (par. 65).
Weld start relay defective	Replace relay (par. 52).
Auxiliary weld start relay defective	Replace relay (par. 53).

35. Welding Gun Will Not Maintain an Arc

<i>Probable cause</i>	<i>Possible remedy</i>
Ground connection inadequate on work pickup cable	Secure ground connection.
Welding wire feeding too slow or not feeding	Refer to paragraph 36.
Weld start relay defective	Replace relay (par. 52).
Auxiliary weld start relay defective	Replace relay (par. 53).

36. Welding Wire Will Not Feed or Feeds too Slow

<i>Probable cause</i>	<i>Possible remedy</i>
Welding control rheostat out of adjustment or defective	Adjust or replace welding control rheostat (pars. 16 and 51).
Friction disk improperly adjusted	Adjust friction disk (par. 10).
Welding wire binding in spool or kinked	Adjust wire in spool and remove kinks (par. 10).
Pressure roll out of adjustment or defective	Adjust or replace pressure roll (pars. 10 and 75).
Feed roll dirty or defective	Service or replace feed roll (par. 32).
Contact tube dirty or defective	Service or replace contact tube (par. 32).
Fuse (F3) defective	Replace fuse (par. 31).
Inlet or outlet guide dirty or defective	Clean or replace guide (par. 74).

37. Argon Gas Will Not Flow

<i>Probable cause</i>	<i>Possible remedy</i>
Argon regulator improperly adjusted or defective	Adjust or replace regulator (par. 16).
Hose kinked or defective	Remove kink or replace hose (par. 10).
Gas ports in welding gun obstructed	Remove obstructions (par. 72).
Solenoid valve defective	Replace valve (par. 45).
Argon switch defective	Replace switch (par. 48).

38. Welding Stops But Argon Flow Continues When Trigger Switch is Released

<i>Probable cause</i>	<i>Possible remedy</i>
Argon switch in MANUAL position	Place switch in AUTO position.
Solenoid valve defective	Replace valve (par. 45).

Section V. FIELD EXPEDIENT REPAIRS

39. General

Operator and organizational maintenance troubles may occur while the welding set is operating in the field where supplies and repair parts are not available and normal corrective action can not be performed. When this condi-

tion exists, the following expedient repairs may be used in emergencies, upon the decision of the unit commander. Equipment so repaired must be removed from operation as soon as possible and properly repaired before being placed in operation again.

40. Wire Fails to Feed When Inching Switch is Depressed

<i>Trouble</i>	<i>Expedient remedy</i>
Inching switch defective	Hand-feed the welding wire and operate the welding gun without the inching switch (par. 73).

41. Wire Feed Motor Inoperative

Trouble

Trigger switch defective

Expedient remedy

Disconnect electrical leads BK and W at terminal board T1 and tape the ends. Remove electrical lead Y from its terminal and install it on the same terminal as lead BR. Operate the welding set, using the line switch (par. 73).

42. Argon Gas Will Not Flow

Trouble

Argon switch defective

Expedient remedy

Disconnect electrical leads V-3 and BK-4 from the switch terminals and splice them together. Tape the connection. Operate the unit without the argon switch (par. 48).

Solenoid valve defective

Disconnect inlet and outlet hoses from the solenoid valve and connect them together. Use the valve at the supply cylinder to control argon flow (par. 45).

Argon hose leaking

Tape the hose in the area of the leak (par. 44).

Warning: Performing any field expedient repair creates a condition possibly dangerous to personnel or equipment. A welding set so re-

paired should be taken out of service as soon as possible for replacement of defective parts.

Section VI. ARGON REGULATOR, SOLENOID VALVE, AND HOSE ASSEMBLY MAINTENANCE INSTRUCTIONS

43. General

The argon gas system provides a continuous blanket of inert gas to shield the weld zone from contamination by the atmosphere. It consists of the argon regulator, argon switch, solenoid valve, and the necessary hoses and electrical wiring.

any tape available. Operate the unit until a replacement hose can be obtained.

44. Valve-to-Connector Hose

a. Removal. Refer to figure 13 and remove the valve-to-connector hose.

45. Solenoid Valve GS

a. Removal. Refer to figure 13 and remove the solenoid valve.

b. Cleaning and Inspection.

b. Cleaning and Inspection.

(1) Remove all dirt and grease from the hose with a cloth dampened in an approved solvent.

(1) Remove all dirt and grease from the valve with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(2) Inspect the hose for cracks, breaks, fraying, and evidence of deterioration. inspect the connectors for damaged or defective threads.

(2) Inspect the valve for cracks, breaks, damaged threads, and damaged wiring insulation.

(3) Replace a defective hose.

(3) Replace a defective valve.

c. Installation. Refer to figure 13 and install the valve-to-connector hose.

c. Installation. Refer to figure 13 and install the solenoid valve.

d. Field Expedient Repair. In the event of a leaking hose with no replacement parts available, tape the hose in the area of the leak with

d. Testing.

(1) Tag and disconnect solenoid valve lead BK-2 from the rectifier SR and lead BK-4 from the argon switch S2.

(2) Use a multimeter and test between the two valve leads. A resistance of 240 ohms should be indicated.

(3) Connect a source of 110 volts dc to the two valve leads. The solenoid should be heard to click open.

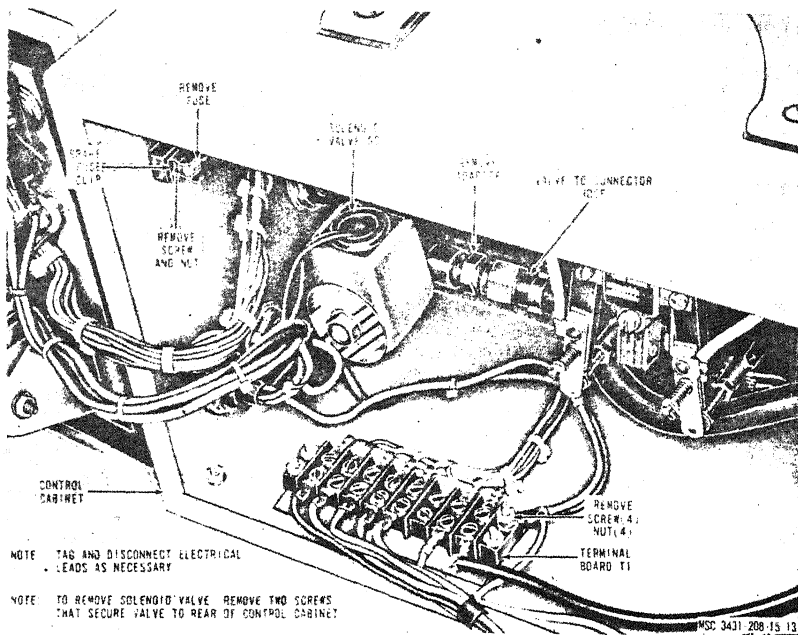


Figure 13. Solenoid valve, control assembly terminal board, spare fuse clip, and valve-to-connector hose, removal and installation.

- (4) Remove the 110-volt source and install the two leads.

e. Field Expedient Repair. In the event of a defective solenoid valve and no replacement parts available, remove the valve as in a above, connect the inlet and outlet hoses together, and operate the unit without the solenoid valve, using the valve at the source of supply to control gas flow.

46. Argon Regulator, Pressure Gage, and Flowmeter

a. Removal. Disconnect the argon hose from the regulator and remove the regulator from the source of supply.

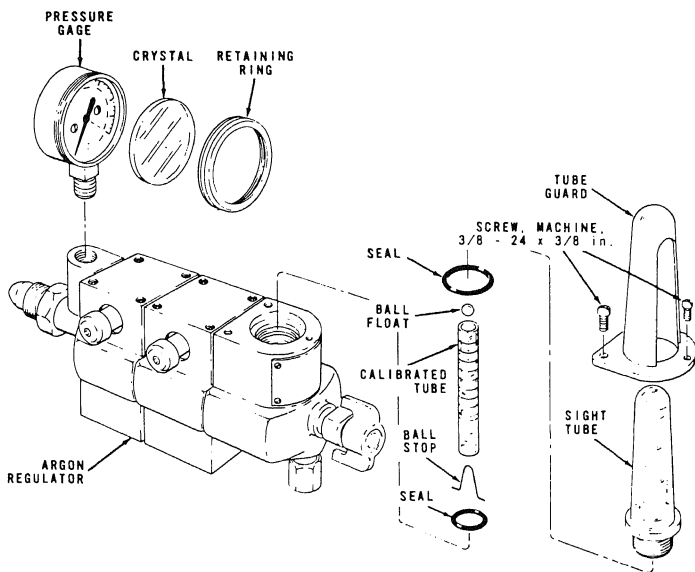
b. Disassembly. Refer to figure 14 and disassemble the argon regulator, pressure gage, and flowmeter.

c. Cleaning, Inspection, and Repair.

- (1) Clean all parts with a clean cloth dampened in an approved cleaning solvent and dry thoroughly.
- (2) Inspect the pressure gage for cracked or dented case, damaged glass, and defective threads.
- (3) Inspect the regulator for cracks, breaks, damaged threads, and other defects.
- (4) Inspect the flowmeter for cracks or broken calibrated tube, dented tube guard, and defective gasket.
- (5) Replace all defective parts.

d. Reassembly. Refer to figure 14 and reassemble the argon regulator, pressure gage, and flowmeter.

e. Installation. Install the regulator at the source of supply and connect the argon hose.



NOTE: WHEN REGULATOR IS REASSEMBLED, INSTALL REGULATOR AT SOURCE OF SUPPLY; TURN ON PRESSURE; AND TEST FOR LEAKS USING SOAPY WATER.

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Figure 14. Argon regulator, pressure gage, and flowmeter, disassembly and reassembly.

Section VII. CONTROL AND CONTRACTOR ASSEMBLIES MAINTENANCE INSTRUCTIONS

47. General

This section contains maintenance procedures for the control and contractor assemblies. When performing maintenance on these assemblies, refer to the practical wiring diagram (fig. 3) and the schematic wiring diagram (fig. 27) for information concerning abbreviations and device identification.

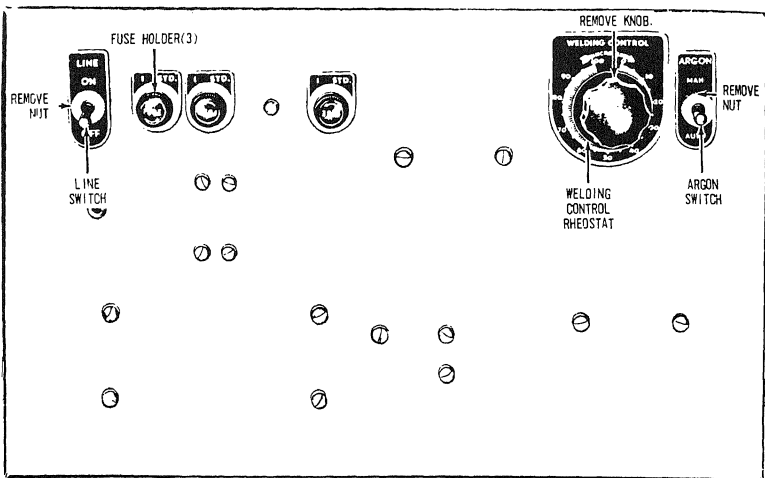
Warning: See that all electrical power is disconnected before performing maintenance on the welding set. Failure to observe this warning can result in serious injury to personnel.

48. Argon Switch S2

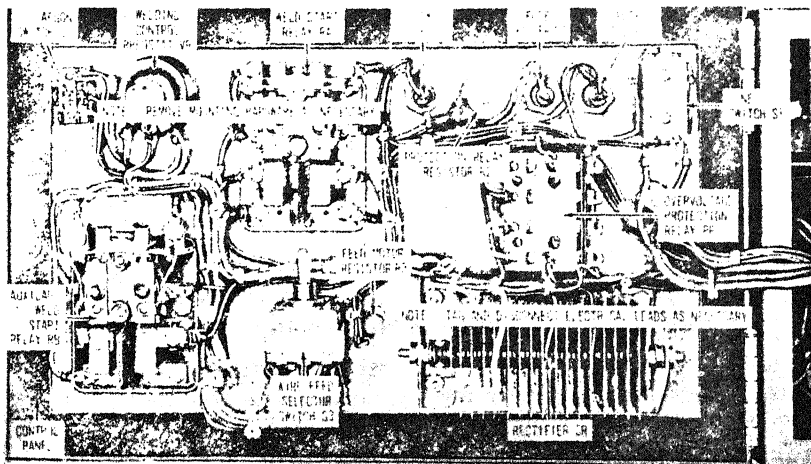
a. *Removal.* Refer to figure 15 and remove the argon switch.

b. *Cleaning and Inspection.*

- (1) Wipe the switch clean with a dry, lint-free cloth. Remove all remaining dirt and dust with compressed air, if available.
- (2) Inspect the switch for cracks, breaks, and defective terminals.



A. CONTROL PANEL, FRONT VIEW.



B. CONTROL PANEL, REAR VIEW.

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Figure 15. Line, argon, and selector switches, fuse holders, auxiliary and weld start relays, overvoltage protection relay, feed motor resistor, protection relay resistor, voltage control rheostat, and rectifier, removal and installation.

- (3) Operate the switch and inspect for defective action.

- (4) Replace a defective switch.

c. Installation. Refer to figure 15 and install the argon switch.

d. Field Expedient Repair. In the event of a defective argon switch and no replacement part available, disconnect electrical leads V-3 and BK-4 from the rear of the argon switch S2, splice them together, and tape the connection. Operate the unit without the argon switch.

49. Line Switch S1

a. Removal. Refer to figure 15 and remove the line switch.

b. Cleaning and Inspection.

- (1) Wipe the switch free of dirt and grease with a clean, dry cloth.
- (2) Inspect the switch for cracks, breaks, defective terminals, and other damage.
- (3) Replace a defective switch.

c. Installation. Refer to figure 15 and install the line switch.

50. Fuse Holders

a. Removal. Refer to figure 15 and remove the fuse holders.

b. Cleaning and Inspection.

- (1) Wipe the fuse holder free of dirt and grease with a clean, dry, lint-free cloth.
- (2) Inspect the holder for cracks, breaks, and broken spring.
- (3) Replace a defective fuse holder.

c. Installation. Refer to figure 15 and install the fuse holders.

51. Welding Control Rheostat VR

a. Removal. Refer to figure 15 and remove the welding control rheostat.

b. Cleaning and Inspection.

- (1) Remove all dirt and grease from the rheostat with a dry, lint-free cloth and compressed air, if available.
- (2) Inspect the rheostat for cracks, breaks, corrosion, and freedom of travel.

- (3) Replace a defective rheostat.

c. Installation. Refer to figure 15 and install the welding control rheostat.

d. Testing.

- (1) Disconnect all electrical leads from the rheostat VR.
- (2) Use a multimeter and test between the two outside terminals. The multimeter should indicate 75 ohms plus or minus 5 percent.
- (3) Test between the inner terminal and one of the outer terminals. Slowly turn the rheostat knob from one extreme to the other. The multimeter should vary smoothly between 0 and 75 ohms.
- (4) Install the electrical leads.

52. Weld Start Relay RA

a. Removal. Refer to figure 15 and remove the weld start relay.

b. Cleaning and Inspection.

- (1) Remove all dirt and grease from the relay with a dry, clean cloth and compressed air, if available.
- (2) Inspect the relay for cracks, breaks, corrosion, burnt or pitted contacts, and loose terminals.
- (3) Replace a defective relay.

c. Installation. Refer to figure 15 and install the weld start relay.

d. Testing.

- (1) Tag and disconnect the two leads BR-7 and two leads BL-2 from the coil terminals.
- (2) Use a multimeter and test between the two coil terminals. A resistance of 288 ohms, plus or minus 10 percent, should be indicated.
- (3) Install the electrical leads.

53. Auxiliary Weld Start Relay RB

a. Removal. Refer to figure 15 and remove the auxiliary weld start relay.

b. Cleaning and Inspection.

- (1) Clean the outer surfaces of the relay with a dry, clean, lint-free cloth. Blow

out all dirt and dust, using compressed air, if available.

- (2) Inspect the relay for cracks, breaks, corrosion, burnt or pitted contact points, and loose terminals.

- (3) Replace a defective relay.

c. *Installation.* Refer to figure 15 and install the auxiliary weld start relay.

d. *Testing.* Refer to paragraph 52 and test the auxiliary weld start relay in a similar manner.

54. Overvoltage Protection Relay PR

a. *Removal.* Refer to figure 15 and remove the overvoltage protection relay.

b. *Cleaning and Inspection.*

- (1) Wipe the outer surfaces of the relay with a dry, clean, lint-free cloth. Blow out all remaining dust and dirt, using compressed air, if available.
- (2) Inspect the relay for cracks, breaks, corrosion, burnt or pitted contact points, and loose or broken terminals.
- (3) Replace a defective relay.

c. *Installation.* Refer to figure 15 and install the overvoltage protection relay.

d. *Testing.* Use a multimeter and test between the two relay coil terminals. The multimeter should indicate a resistance of 255 ohms, plus or minus 10 percent.

e. *Adjustment.*

- (1) Loosen the locknut on the residual screw located in the center of the relay armature.
- (2) Manually close the relay armature and tighten the residual screw until it just contacts the pole piece.
- (3) Apply a voltage of 8 volts dc to the relay coil terminals and manually operate the relay. Once operated, the relay should stay closed.
- (4) Turn the residual screw until the relay just drops out. Lock the residual screw in that position by tightening the locknut.

55. Wire Feed Selector Switch S3

a. *Removal.* Refer to figure 15 and remove the selector switch.

b. *Cleaning and Inspection.*

- (1) Wipe the switch clean with a cloth dampened in an approved cleaning solvent and dry thoroughly.
- (2) Inspect the switch for cracks, breaks, corrosion, and other damage.
- (3) Replace a defective switch.

c. *Installation.* Refer to figure 15 and install the selector switch.

56. Rectifier SR

a. *Removal.* Refer to figure 15 and remove the rectifier.

Warning: When malfunction of the selenium rectifier occurs, thoroughly ventilate the rectifier to avoid inhalation of poisonous fumes. Do not handle the damaged rectifier. Selenium compound can be absorbed through the skin especially when hot. Failure to observe this warning can result in severe injury or death.

b. *Cleaning and Inspection.*

- (1) Remove all dirt and grease from the rectifier with a cloth dampened in an approved cleaning solvent and dry thoroughly.
- (2) Inspect the rectifier for cracks, breaks, defective terminals, and other damage.
- (3) Replace a defective rectifier.

c. *Installation.* Refer to figure 15 and install the rectifier.

d. *Testing.*

- (1) Tag and disconnect lead R-2 from R1 resistor.
- (2) Place argon switch in AUTO position.
- (3) Use multimeter and test between the red terminal and black terminal of the rectifier. Reserve the leads and test between the same two terminals. A low resistance should be indicated in one direction, and an extremely high resistance indicated in the other.
- (4) Install the electrical leads.

57. Feed Motor Resistor R3

a. *Removal.* Refer to figure 15 and remove the feed motor resistor.

b. *Cleaning and Inspection.*

- (1) Wipe the resistor free of dirt and grease with a dry, clean cloth.
- (2) Inspect the resistor for cracks, breaks, and defective terminals.
- (3) Replace a defective resistor.

c. *Installation.* Refer to figure 15 and install the feed motor resistor.

d. *Testing.*

- (1) Place the wire feed selector switch S3 in CP position.
- (2) Use a multimeter and test between the two terminals of resistor R3. A resistance of 5 ohms, plus or minus 10 percent, should be indicated.

58. Protection Relay Resistor R2

a. *Removal.* Refer to figure 15 and remove the protection relay resistor.

b. *Cleaning and Inspection.*

- (1) Remove all dirt and grease from the resistor, using a dry, clean cloth.
- (2) Inspect the resistor for cracked or broken ceramic insulator and defective terminals.
- (3) Replace a defective resistor.

c. *Installation.* Refer to figure 15 and install the protection relay resistor.

d. *Testing.*

- (1) Tag and disconnect all electrical leads attached to the resistor.
- (2) Use a multimeter and test between the two end terminals of the resistor. A resistance of 600 ohms, plus or minus 5 percent, should be indicated.
- (3) Install the electrical leads.

e. *Adjustment.*

Note. Before the protection relay resistor can be properly adjusted, the voltage drop resistor must be set for the correct voltage (par. 59).

- (1) Place the wire feed selector switch S3 in STD position and the line switch S1 in OFF position.

- (2) Connect a jumper lead across the weld start relay terminals to which leads BR-25 and R-24 are connected.

- (3) Connect a jumper lead between terminal 7 of the T1 terminal board and the sliding tap of R1 resistor to which the electrical lead 0-5 is connected.

- (4) Position the sliding tap of R-2 resistor at approximate center (300 ohms).

- (5) Connect the welding set to a source of 115-volts (par. 10).

- (6) Place the line switch in the ON position and the selector switch in CP position. The protection relay should buzz.

- (7) If the relay contacts close, place the line switch in OFF and move the sliding tap of the R1 resistor toward the control panel. If the relay neither closes or buzzes, move the sliding tap away from the control panel.

- (8) Repeat steps 6 and 7 until the protection relay buzzes when the line switch is on.

- (9) Remove the jumper leads and disconnect the welding set from the 115-volt source.

59. Voltage Drop Resistor R1

a. *Removal.* Refer to figure 16 and remove the voltage drop resistor (R1).

b. *Cleaning and Inspection.*

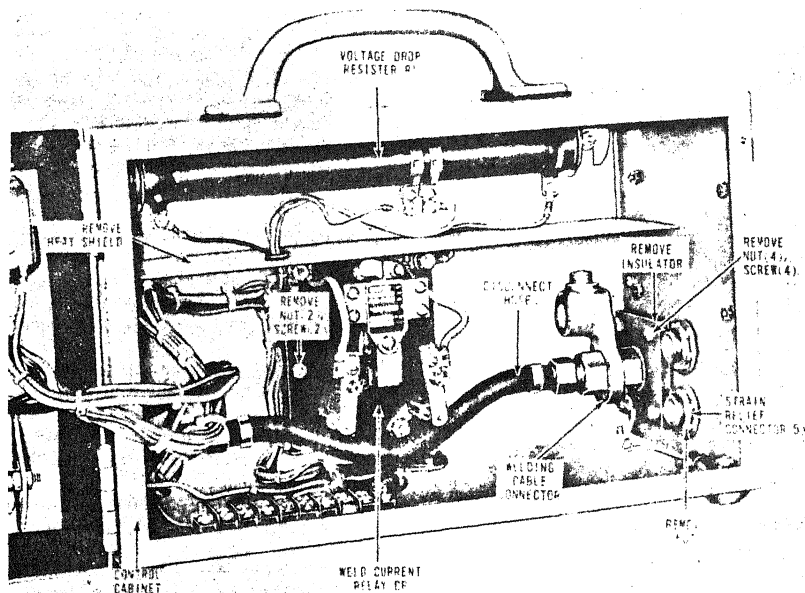
- (1) Remove all dirt and grease from the resistor with a clean, dry cloth.
- (2) Inspect the resistor for cracked or broken ceramic insulator and defective terminals.
- (3) Replace a defective resistor.

c. *Installation.* Refer to figure 16 and install the voltage drop resistor.

d. *Testing.*

- (1) Tag and disconnect all electrical leads from resistor R1.

- (2) Use a multimeter and test between the two end terminals of the resistor. A resistance of 250 ohms, plus or minus 10 percent, should be indicated.



NOTE: TAG AND DISCONNECT ELECTRICAL LEADS AS NECESSARY.

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Figure 16. Voltage drop resistor, current relay, strain relief connectors, and power cable connector, removal and installation.

(3) Install the electrical leads.

e. Adjustment.

- (1) Place the line switch S1 in the OFF position.
- (2) Connect the welding set to a source of 115 volts.
- (3) Place the line switch in the ON position.
- (4) Use a dc voltmeter and test between the two end terminals of R1 resistor. A reading of no less than 106 volts should be obtained.
- (5) Test between the sliding tap to which lead 0-5 is connected and the end terminal to which lead BL-2 is connected. A reading of 35 volts should

be obtained. If the voltage reading is less than 35 volts, place the line switch in the OFF position and move the sliding tap toward lead R-1. If the voltage is greater than 35 volts, move the sliding tap toward lead BL-2. Place the line switch on and observe the voltmeter. Repeat the adjustment until the correct voltage is obtained.

- (6) Test between the sliding tap to which lead Y-6 is connected and the end terminal to which lead BL-2 is connected. A reading of 25 volts should be obtained. If a reading of 24 volts is not obtained, adjust the sliding tap as described in step (5) above.

- (7) Place the line switch in the OFF position and disconnect the 115-volt source.

60. Spare Fuse Clip

a. *Removal.* Refer to figure 13 and remove the spare fuse clip.

b. *Cleaning and Inspection.*

- (1) Remove all dirt and grease from the fuse clip with a clean cloth.
- (2) Inspect the clip for cracks, breaks, and other damage.
- (3) Replace a defective fuse clip.

c. *Installation.* Refer to figure 13 and install the spare fuse clip.

61. Control Assembly Terminal Board T1

a. *Removal.* Refer to figure 13 and remove the control assembly terminal board.

b. *Cleaning and Inspection.*

- (1) Remove all dirt and grease from the terminal board with a cloth dampened in an approved cleaning solvent and dry thoroughly.
- (2) Inspect the terminal board for cracks, breaks, and other damage.
- (3) Replace a defective terminal board.

c. *Installation.* Refer to figure 13 and install the control assembly terminal board.

62. Weld Current Relay RC

a. *Removal.* Refer to figure 16 and remove the weld current relay.

b. *Cleaning and Inspection.*

- (1) Wipe the relay free of dirt and grease with a clean, dry cloth. Remove all remaining dust and dirt with compressed air, if available.
- (2) Inspect the relay for cracks, breaks, burnt or pitted contacts, loose terminals, and broken springs.
- (3) Replace a defective relay.

c. *Installation.* Refer to figure 16 and install the weld current relay.

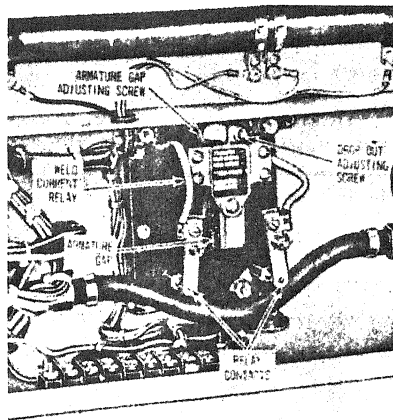
d. *Adjustment.* Refer to figure 17 and adjust the weld current relay.

63. Welding Cable Connector

a. *Removal.* Refer to figure 16 and remove the welding cable connector.

b. *Cleaning and Inspection.*

- (1) Wash the connector in an approved cleaning solvent and dry thoroughly.
- (2) Inspect the connector for cracks, breaks, and damaged threads.
- (3) Replace a defective connector.



ARMATURE GAP:

MEASURE ARMATURE GAP USING FEELER GAGE. GAP SHOULD BE SET AT 0.054 INCH. IF NOT, LOOSEN LOCKNUT AND ADJUST ARMATURE GAP ADJUSTING SCREW UNTIL CORRECT GAP IS OBTAINED. TIGHTEN LOCKNUT.

DROP OUT:

- STEP 1. CONNECT 12-1/2 FT WELDING CABLE IN SERIES WITH LOW VOLTAGE CIRCUIT TESTER AND 24-VOLT DC POWER SOURCE AS FOLLOWS:
- a. PLACE ALL CIRCUIT TESTER CONTROLS IN OFF POSITION.
 - b. CONNECT NEGATIVE SIDE OF POWER SOURCE TO WELDING CABLE CONNECTOR AND POSITIVE SIDE TO 100 AMP TERMINAL OF CIRCUIT TESTER AMMETER.
 - c. DISCONNECT 12-1/2 FT WELDING CABLE FROM CONTACTOR (PAR. 10) AND CONNECT IT TO 24-VOLT TERMINAL OF CIRCUIT TESTER LOAD BANK.
- STEP 2. TURN LOAD BANK SWITCH ON. SET LOAD BANK FOR 50 AMP LOAD. MANUALLY CLOSE CURRENT RELAY CONTACTS.
- STEP 3. DECREASE AMPERAGE UNTIL CONTACTS OPEN. THIS SHOULD OCCUR AT APPROXIMATELY 27 AMPS.
- STEP 4. IF CONTACTS DO NOT OPEN REMOVE SPRING FROM SPRING ADJUSTING SCREW, LOOSEN LOCKNUT, AND TIGHTEN ADJUSTING SCREW. INSTALL SPRING AND REPEAT STEPS 2 THROUGH 4 UNTIL CONTACTS OPEN AT CORRECT AMPERAGE. TIGHTEN LOCKNUT.

Figure 17. Weld current relay adjustment.

c. *Installation.* Refer to figure 16 and install the welding cable connector.

64. Strain Relief Connectors

a. *Removal.* Refer to figure 16 and remove the strain relief connectors.

b. *Cleaning and Inspection.*

- (1) Wipe the connectors free of dirt and grease with a cloth dampened in an approved cleaning solvent and dry thoroughly.
- (2) Inspect the connectors for cracks, breaks, and damaged threads. Inspect the connectors for burrs that might damage cable insulation.
- (3) Remove all burrs, using a file or stone. Replace a defective connector.

c. *Installation.* Refer to figure 16 and install the strain relief connectors.

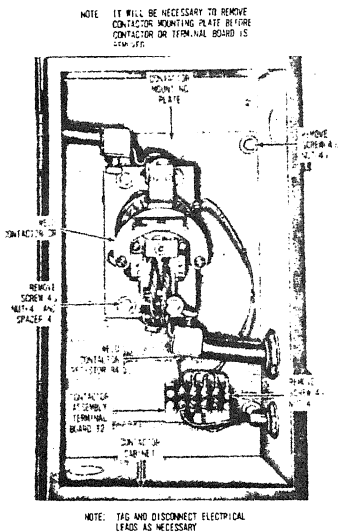
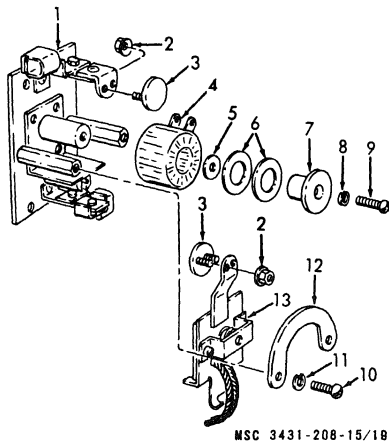


Figure 18. Weld contactor, contactor assembly terminal board, and weld contactor resistor.



- 1 Coil mounting plate
- 2 Nut, hex, $\frac{1}{8}$ -24 (4 rqr)
- 3 Contact point (2 rqr)
- 4 Coil
- 5 Washer, flat (spec)
- 6 Spring washer (2 rqr)
- 7 Coil retainer
- 8 Washer, lock, $\frac{1}{8}$ in.
- 9 Screw, machine, $\frac{1}{4}$ -20 x 1 in.
- 10 Screw, machine, $\frac{1}{4}$ -20 x $\frac{1}{2}$ in. (2 rqr)
- 11 Washer, lock, $\frac{1}{8}$ in. (2 rqr)
- 12 Armature plate
- 13 Armature

Figure 19. Weld contactor, disassembly and reassembly.

65. Weld Contactor

a. *Removal.* Refer to figure 18 and remove the weld contactor.

b. *Disassembly.* Refer to figure 19 and disassemble the weld contactor.

c. *Cleaning, Inspection, and Repair.*

- (1) Wipe the contactor free of dirt and grease with a clean, dry, lint-free cloth. Blow the contactor clean with compressed air, if available.
- (2) Inspect the contactor for cracks, breaks, damaged threaded components, weak or distorted springs, and burnt or pitted contacts. Inspect the

- (3) Repair or replace a damaged or defective contactor as necessary.

d. *Reassembly.* Refer to figure 19 and reassemble the weld contactor.

e. *Installation.* Refer to figure 18 and install the weld contactor.

f. *Testing.*

- (1) Tag and disconnect the two leads from the contactor coil terminals.
- (2) Use a multimeter and test between the two coil terminals. A reading of 580 ohms, plus or minus 10 percent, should be obtained.
- (3) Connect the two leads to the coil terminals.

66. Weld Contactor Resistor R4

a. *Removal.* Refer to figure 18 and remove the weld contactor resistor.

b. *Cleaning and Inspection.*

- (1) Wipe the resistor free of dirt and grease with a dry, clean cloth.
- (2) Inspect the resistor for cracks, breaks, damaged terminals, and evidence of overheating.
- (3) Replace a defective resistor.

c. *Installation.* Refer to figure 18 and install the weld contactor resistor.

d. *Testing.*

- (1) Tag and disconnect the two leads from the contactor coil terminals.
- (2) Use a multimeter and test between the two resistor terminals. A reading of 2000 ohms, plus or minus 10 percent, should be obtained.
- (3) Install the contactor coil leads.

67. Contactor Assembly Terminal Board (T2)

a. *Removal.* Refer to figure 18 and remove the contactor assembly terminal board.

b. *Cleaning and Inspection.*

- (1) Wipe the terminal board clean with a cloth dampened in an approved cleaning solvent and dry thoroughly.

- (2) Inspect the terminal board for cracks, breaks, and loose or broken terminals.

- (3) Replace a defective terminal board.

c. *Installation.* Refer to figure 18 and install the contactor assembly terminal board.

68. Electrical Cables

a. *Removal.*

- (1) Disconnect and remove the electrical cables from the contactor and control assemblies (par. 10).
- (2) Disconnect and remove the electrical cables from the welding gun (pars. 72 and 73).

b. *Cleaning and Inspection.*

- (1) Wipe the cables clean with a cloth dampened in an approved cleaning solvent and dry thoroughly.
- (2) Inspect the cables for cracks, breaks, broken terminal connectors, and evidence of deteriorated insulation.
- (3) Replace broken terminal connectors. Tape cables that have slightly damaged insulation. Replace a defective cable.

c. *Installation.*

- (1) Install and connect the electrical cables to the welding gun (pars. 72 and 73).
- (2) Install and connect the electrical cables to the contactor and control assemblies (par. 10).

69. Contactor Cabinet

a. *Removal.*

- (1) Remove the electrical cables from the contactor assembly (par. 10).
- (2) Remove the strain relief connectors (par. 64).
- (3) Remove the contactor, contactor assembly terminal board, and weld contactor resistor from the contactor cabinet (pars. 61, 65, and 66).

b. *Cleaning, Inspection, and Repair.*

- (1) Wash the contactor cabinet in an approved cleaning solvent and dry thoroughly.

(2) Inspect the cabinet for cracks, breaks, dents, defective door latches and hinges, and damaged paint.

(3) Remove all dents, weld all cracks or breaks, and paint as necessary. Replace a defective contactor cabinet.

c. Installation.

(1) Install the electrical cables in the contactor assembly (par. 10).

(2) Install the strain relief connectors (par. 64).

(3) Install the contactor, contactor assembly terminal board, and weld contactor resistor in the contactor cabinet (pars. 61, 65, and 66).

the welding set. Failure to observe this warning can result in serious injury to personnel.

b. Inspection.

(1) Inspect insulation for cracks, fraying, and deterioration. Pay special attention where wires pass through holes and over rough edges. Wrap cracked or frayed places with an approved electrical tape. Replace defective wires.

(2) Inspect wire terminals for cracks, corrosion, and insecure mounting. Replace a defective terminal.

c. Testing. To test a wire for continuity, disconnect each end of the wire and touch the probes of a multimeter to each end of the wire. The multimeter should indicate continuity.

d. Repair.

(1) If a wire is broken, remove sufficient insulation from each side of the break to allow a good connection. Twist them together, solder the connection, and wrap it with electrical tape. Under no condition leave the connection exposed.

(2) If a wire is broken from a terminal connector, replace the terminal connector.

70. Wiring

a. General. The practical wiring diagram (fig. 3) and schematic wiring diagram (fig. 27) should be consulted when work on the electrical system is necessary. To facilitate maintenance on wiring and electrical components, tag all wiring and terminals before removing components to insure proper reinstallation.

Warning: See that all electrical power is disconnected before performing maintenance on

Section VIII. WELDING GUN MAINTENANCE INSTRUCTIONS

71. General

This section contains information necessary for maintenance of the welding gun. When replacing welding gun components, always replace with identical parts to insure proper operation of the unit.

72. Nozzle and Retainer, Nozzle Holder, Insulator Sleeve, Current Body, Contact Tube, and Front Housing

u. Removal and Disassembly. Refer to figure 20 and remove and disassemble the nozzle and retainer, nozzle holder, insulator sleeve, current body, contact tube, and front housing.

b. Cleaning, Inspection, and Repair.

(1) Remove all dirt and grease, using a cloth dampened in an approved cleaning solvent and dry thoroughly.

(2) Inspect all parts for cracks, breaks, distortion, and aluminum deposits.

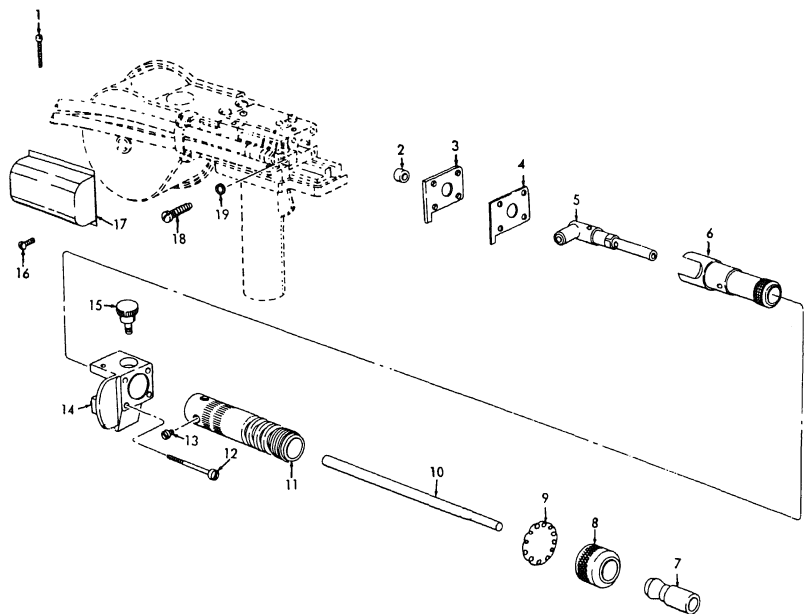
(3) Inspect the nozzle and retainer for spatter.

(4) Inspect the contact tube for cracks, spatter, and bends.

(5) Inspect current screw for damaged threads and gas port restrictions.

(6) Remove all spatter from the nozzle and contact tube, using a file or reamer. Straighten bends in the contact tube. Replace all defective parts.

c. Reassembly and Installation. Refer to figure 20 and reassemble and install the nozzle and retainer, nozzle holder, insulator sleeve, current body, contact tube, and front housing.



MSC 3431-208-15/20

- | | |
|---|--|
| 1 Screw, machine, $\frac{1}{4}$ -28 x $\frac{3}{4}$ in. | 11 Nozzle holder |
| 2 Guide bushing | 12 Screw, machine, $\frac{3}{16}$ -24 x $1\frac{1}{2}$ in. (4 rqr) |
| 3 Insulator plate | 13 Screw, machine, $\frac{3}{16}$ -24 x $\frac{3}{8}$ in. (3 rqr) |
| 4 Gasket | 14 Front housing |
| 5 Current body | 15 Contact tube lockscrew |
| 6 Insulator sleeve | 16 Screw, machine, $\frac{1}{4}$ -28 x $\frac{3}{4}$ in. (4 rqr) |
| 7 Nozzle | 17 Cable shield |
| 8 Nozzle retainer | 18 Current screw |
| 9 Spring | 19 Compression washer (2 rqr) |
| 10 Contact tube | |

Figure 20. Nozzle and retainer, nozzle holder, insulator sleeve, current body, contact tube, and front housing, removal, disassembly, reassembly, and installation.

73. Trigger, Trigger Switch S5, Inching Switch S4, and Motor Capacitor C1

a. Removal.

- (1) *Inching switch and motor capacitor.*
Refer to figure 21 and remove the inching switch and motor capacitor.

- (2) *Trigger switch.*

- (a) Remove the welding gun front housing (par. 72).

- (b) Refer to figure 22 and remove the trigger switch.

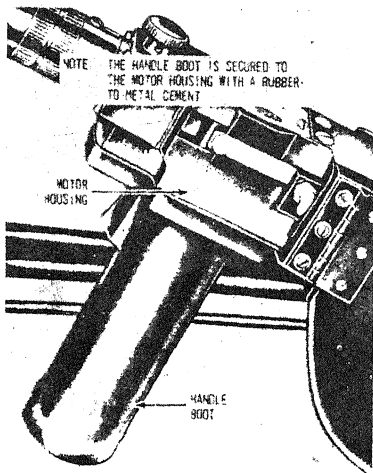
(3) *Trigger.*

- (a) Remove the handle boot as in (1) above.

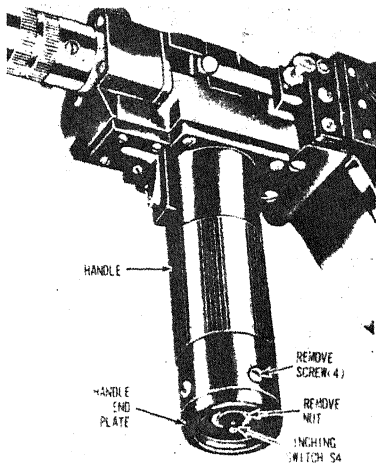
- (b) Refer to figure 22 and remove the trigger.

b. *Cleaning and Inspection.*

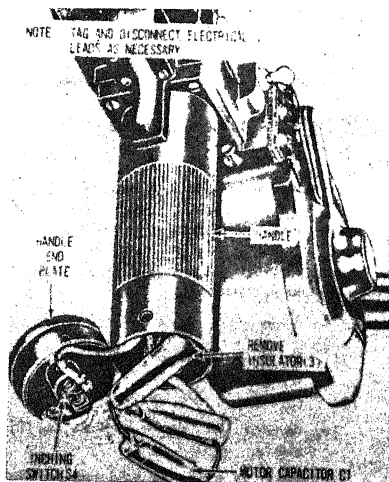
- (1) Clean all parts with a clean cloth



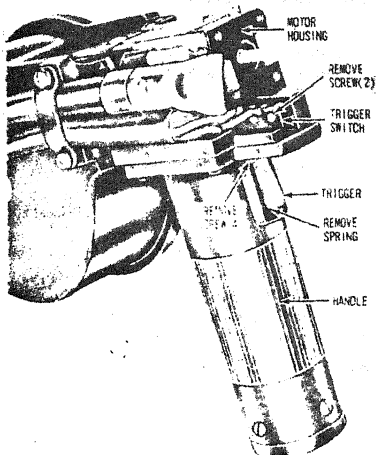
STEP 1. REMOVE HANDLE BOOT



STEP 2. REMOVE HANDLE END PLATE.



STEP 3. REMOVE INCHING SWITCH AND MOTOR CAPACITOR.



NOTE: TAG AND DISCONNECT ELECTRICAL LEADS AS NECESSARY

MSC 3431-208-15/72

Figure 22. Trigger and trigger switch, removal and installation.

dampened in an approved cleaning solvent and dry thoroughly.

- (2) Inspect for cracks, breaks, and loose or broken terminals.
- (3) Test the capacitor for leaks or shorts, using a suitable capacitor tester. It should show a capacitance of 0.05 μ f
- (4) Inspect the switch for defective action by depressing the switch button.
- (5) Replace a defective switch or capacitor.

c. Installation.

- (1) *Inching switch and motor capacitor.*
Refer to figure 21 and install the inching switch and motor capacitor.
- (2) *Trigger switch.*
 - (a) Refer to figure 22 and install the trigger switch.
 - (b) Install the welding gun front housing (par. 72).
- (3) *Trigger.*
 - (a) Refer to figure 22 and install the trigger.

- (b) Install the handle boot as in (1) above.

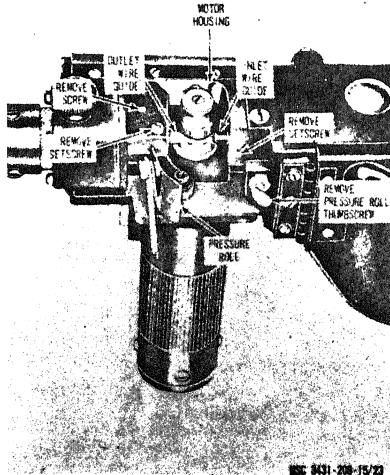
d. Field Expedient Repair.

- (1) *Inching switch.* In the event there is a defective inching switch and no replacement is available, hand-feed the welding wire and operate the unit without the inching switch.
- (2) *Trigger switch.* Should it become necessary to operate the welding set with a defective trigger switch, the trigger switch can be bypassed and the line switch used to control the welding gun. Disconnect electrical leads BK and W from the T1 terminal board and tape the ends. Disconnect electrical lead Y from the terminal board and install it on the same terminal as electrical lead BR.

74. Inlet and Outlet Wire Guides

a. Removal.

- (1) Rewind the welding wire on the wire spool until it is clear of the wire guides.



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Figure 23. Inlet and outlet wire guides and pressure roll, removal and installation.

- (2) Refer to figure 23 and remove the wire guides.

b. Cleaning and Inspection.

- (1) Clean the guides in an approved cleaning solvent and dry thoroughly.
- (2) Inspect the guides for cracks, breaks, and wear.
- (3) Replace a defective wire guide.

75. Pressure Roll

a. Removal. Refer to figure 23 and remove the pressure roll.

b. Cleaning and Inspection.

- (1) Wash the pressure roll in an approved cleaning solvent and dry thoroughly.
- (2) Inspect for cracks, breaks, and defective roller.
- (3) Replace a defective pressure roll.

c. Installation. Refer to figure 23 and install the pressure roll.

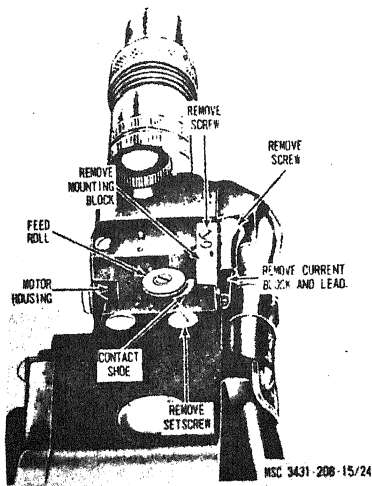


Figure 24. Feed motor contact shoe, removal and installation.

76. Feed Motor Contact Shoe

a. Removal.

- (1) Remove the cable shield (par. 72).
- (2) Refer to figure 24 and remove the contact shoe.

b. Cleaning and Inspection.

- (1) Clean the contact shoe and mounting block with a cloth dampened in an approved cleaning solvent.
- (2) Inspect the contact shoe for burning and pitting.
- (3) Inspect the spring for a weak or distorted condition.
- (4) Inspect the mounting block for cracks, breaks, and other damage.
- (5) Replace all defective parts.

c. Installation.

- (1) Refer to figure 24 and install the feed motor contact shoe.
- (2) Install the cable shield (par. 72).

77. Welding Gun Wire Spool Inclosure

a. Removal.

- (1) Remove the welding wire from the wire spool inclosure (par. 10).

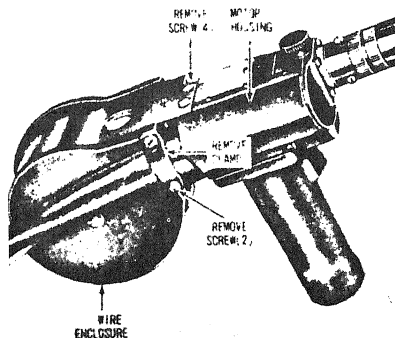
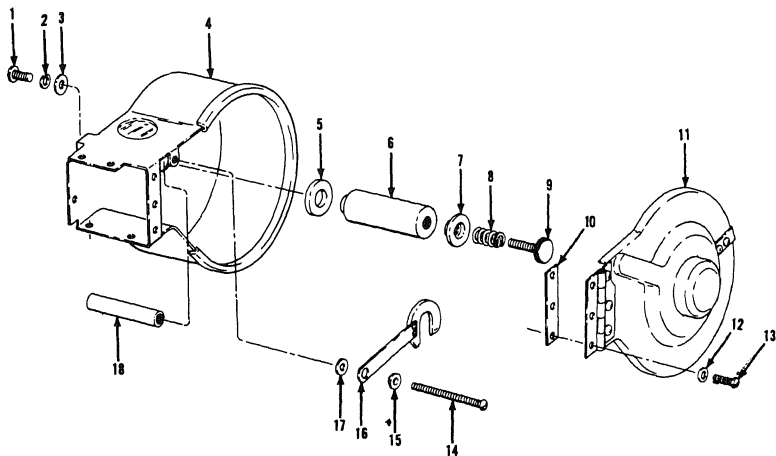


Figure 25. Welding gun wire spool inclosure, removal and installation.



WSC 3431-208-15/26

- 1 Screw, machine, $\frac{1}{4}$ -20 x $\frac{1}{2}$ in.
- 2 Washer, lock, $\frac{1}{2}$ in.
- 3 Washer, flat, $\frac{1}{2}$ in.
- 4 Spool inclosure
- 5 Washer, nonmetallic
- 6 Shaft
- 7 Bushing
- 8 Spring
- 9 Brake screw

- 10 Spacer
- 11 Cover
- 12 Washer, flat, $\frac{5}{16}$ in. (3 rqr)
- 13 Screw, machine, No. 4-40 x $\frac{3}{4}$ in. (3 rqr)
- 14 Screw, machine, $\frac{5}{16}$ -24 x 2 in.
- 15 Washer, nonmetallic
- 16 Disk retainer
- 17 Spacer
- 18 Roller

Figure 26. Welding gun wire spool inclosure, disassembly and reassembly.

- (2) Refer to figure 25 and remove the wire spool inclosure.

b. *Disassembly.* Refer to figure 26 and disassemble the wire spool inclosure.

c. *Cleaning, Inspection, and Repair.*

- (1) Wash the inclosure in an approved cleaning solvent and dry thoroughly.
- (2) Inspect the inclosure for cracks, breaks, dents, and other damage.

- (3) Inspect the friction disk for bends, wear, and binding.

- (4) Repair or replace the wire spool inclosure as necessary.

d. *Reassembly.* Refer to figure 25 and reassemble the wire spool inclosure.

e. *Installation.*

- (1) Refer to figure 26 and install the wire spool inclosure.
- (2) Load the welding gun (par. 10).

CHAPTER 4

DEMOLITION OF MATERIEL TO PREVENT ENEMY USE

78. General

When capture or abandonment of the welding set to an enemy is imminent, the responsible unit commander must make the decision either to destroy the equipment or render it inoperative. Based on this decision, orders are issued which cover the desired extent of destruction. Whatever method of demolition is employed, it is essential to destroy the same vital parts of all welding sets and all corresponding repair parts.

79. Demolition to Render the Welding Set Inoperative

Use sledge hammers, crowbars, picks, axes, or any other available tools to destroy the following:

- a. Welding gun.

Note. The above items are minimum requirements to render the unit inoperative.

- b. Control assembly.
- c. Contactor assembly.
- d. Argon regulator.
- e. Cables.

80. Other Demolition Methods

- a. *Scattering and Concealment.* Remove all easily accessible parts such as the welding gun

and argon regulator and scatter them in dense foliage, bury them in sand or dirt, or throw them in a lake, stream, or other body of water.

- b. *Burning.* Pack rags, canvas, or clothing around and inside the welding set. Saturate with oil or gasoline and ignite.

- c. *Submersion.* Fully submerge the welding set in a body of water to provide water damage and concealment. Salt water will damage metal parts more than fresh water.

81. Training

All operators should receive thorough training in the destruction of the welding set. Refer to FM 5-25. Simulated destruction, using all of the methods listed above, should be included in the operator training program. It must be emphasized in training, that demolition operations are usually necessitated by critical situations when time available for carrying out destruction is limited. For this reason, it is necessary that operators be thoroughly familiar with all methods of destruction of equipment, and be able to carry out demolition instructions without reference to this or any other manual.

CHAPTER 5

SHIPMENT AND LIMITED STORAGE

Section I. SHIPMENT WITHIN ZONE OF INTERIOR

82. Preparation of Equipment for Shipment

a. General. Detailed instructions for the preparation for domestic shipment are outlined within this paragraph.

b. Inspection. Refer to paragraph 8 and inspect the welding set. DA Form 2404 (Equipment Inspection and Maintenance Worksheet) will be executed on the equipment.

c. Cleaning and Drying. Thorough cleaning and drying by an approved technique is the first essential procedure in any effective preservation process. Approved methods of cleaning and drying are described in TM 38-230.

d. Painting. Paint all surfaces when the paint has been removed or damaged. Refer to TB ENG 60 for detailed cleaning and painting instructions.

e. Sealing of Openings. Seal all openings in welding gun, gas regulator, and hose with pressure-sensitive tape conforming to Specification PPP-T-60, type III, class 1.

f. Marking. Marking will conform to MIL-STD-129.

g. Disassembly. Refer to paragraph 10 for guidance and disassemble the welding set.

h. Hoses and Cables. Coil the hoses and cables to a minimum safe diameter and tie or strap the coil to the equipment to prevent movement.

i. Packing. Refer to TM 38-230 for guidance in selecting, fabricating, and packing the container for the welding set. Pack the basic issue items with the welding set. Make sure that the welding set, disassembled components, and the basic issue items are adequately cushioned, blocked, and braced to prevent damage during transit.

83. Loading the Equipment for Shipment

a. The crated welding set may be loaded by manpower or by forklift truck.

b. Block or tie the crated welding set, top side up in the carrier to prevent shifting during transportation.

c. The welding set should be shipped in a closed carrier. If necessary to ship the welding set by open carrier, cover.

Section II. LIMITED STORAGE

84. Preparation of Equipment for Storage

a. General. Detailed instructions for preserving and maintaining equipment in limited storage are outlined in this paragraph. Limited storage is defined as storage not to exceed 6 months. Refer to AR 743-505.

b. Inspection. Refer to paragraph 8 and inspect the welding set. DA Form 2404, will be executed on the equipment.

c. Cleaning and Drying. Thorough cleaning and drying by an approved technique is the

first essential procedure in any effective preservation process. Approved methods of cleaning and drying are described in TM 38-230.

d. Painting. Paint all surfaces when the paint has been removed or damaged. Refer to TB ENG 60 for detailed cleaning and painting instructions.

e. Sealing of Openings. Seal all openings in welding gun, gas regulator and hose with pressure-sensitive tape conforming to Specification PPP-T-60, type III, Class 1.

f. Disassembly, Disassembled Parts, and Basic Issue Items.

- (1) Limit disassembly to removal of components that interfere with storage or are subject to pilferage or damage. Refer to paragraph 10 for guidance in disassembly of the welding set.
- (2) Place the welding set, disassembled components, and basic issue items in a suitable container to prevent loss or damage.

g. Hoses and Cables. Coil the hoses and cables to a minimum safe diameter and tie or strap the coil to the equipment to prevent movement.

h. Storage. Provide closed (warehouse) storage for the welding set.

85. Inspection and Maintenance of Equipment in Storage

a. Inspection. When the welding set has been placed in storage, all scheduled preventive maintenance services, including inspection, will be suspended and preventive maintenance inspection will be performed as specified herein. Refer to AR 743-505.

b. Worksheet and Preventive Maintenance. Applicable forms listed in TM 38-750 will be prepared for each welding set when initially placed in limited storage, and in accordance with the scheduled interval contained in current AR 743-505 thereafter. Perform required maintenance promptly to make sure the welding set is mechanically sound and ready for immediate use.

CHAPTER 6

FIELD AND DEPOT MAINTENANCE INSTRUCTIONS

Section I. GENERAL

86. Scope

a. The following instructions are for field and depot maintenance personnel. They contain information on equipment maintenance that is beyond the scope of the tools, equipment, personnel, or supplies normally available to organizational maintenance.

b. Appendix I includes the publications applicable to field and depot maintenance. Appendix II contains the maintenance allocation chart. The field and depot maintenance repair

parts and special tool lists are listed in TM 5-3431-208-25P.

87. Record and Report Forms

For record and report forms applicable to field and depot maintenance, refer to TM 38-750.

Note. Applicable forms, excluding Standard Form 46 (United States Government Motor Vehicle Operator's Identification Card), which is carried by the operator, will be kept in a canvas bag mounted on the welding set.

Section II. DESCRIPTION AND DATA

88. Description

For a complete description of the welding set, Linde Model SWM-9-A, see paragraph 3.

89. Tabulated Data

a. Wire Feed Motor.

Manufacturer..... Linde Co.
Rated voltage..... 24 v, dc
Load speed..... 310-370 rpm (Revolutions per minute) at a 17 in. oz (ounce) load with 24 v, dc applied
No load speed..... 370-400 with 24 v, dc applied
Load current..... 0.370-0.480 amp (ampere(s))

No load current 0.150-0.270 amp
Duty..... Continuous

b. *Wiring Diagram.* Refer to figure 27 for a schematic diagram of the welding set.

c. *Time Standards.* Table I lists the number man-hours required under normal conditions to perform the indicated maintenance and repair of the welding set. Components are listed under the appropriate functional index. The time listed are not intended to be rigid standards. Under adverse conditions, the operations will take longer; but under ideal conditions, with highly skilled mechanics, most of the operations can be accomplished in considerable less time.

Figure 27. Schematic wiring diagram.

(Located in back of Manual)

Table 1. Time Standards

1. Lubrication and Service

44 WELDING EQUIPMENT

4415 HEAD, TORCH, AND GUN UNITIZED COMPONENTS

Torch	0.2
(Includes loading torch with full spool of welding wire.)	
Feed roll assembly	0.3
(Includes remove, clean, and replace.)	
Nozzle and holder	0.3
(Includes remove, clean, and replace.)	

Hours

2. Removal and Replacement

44 WELDING EQUIPMENT

4407 CONTROL PANELS

Cabinet, voltage control	5.0
Cabinet, contactor	1.0

4408 CONNECTING DEVICES

Terminal board (T1)	1.0
(Tag, remove, and replace leads.)	
Connector torch cable	0.3
Cable contactor	0.1
Cable welding	0.1
Hose, argon gas	0.2
Cable, torch	0.4
(Grounding and power.)	

4409 PROTECTIVE DEVICES

Fuse	0.1
Holder, fuse	0.2

4410 SWITCHING, TIMING AND SPEED CONTROL

Contactor assembly	0.5
(Includes tagging leads.)	

4410 SWITCHING, TIMING AND SPEED CONTROL

Contactor	0.2
(Contactor assembly removed.)	
Points, contact	0.3
Solenoid, gas valve	0.8

Table 1. Time Standards—Continued

Coil, contactor	0.5
(Contactor assembly removed.)	
Switch, main line	0.2
Switch, power	0.5
(Includes tagging leads.)	
Switch, argon	0.2
Switch, trigger	0.5
Button, inching	0.3
Capacitor	0.4

4411 RESISTOR COMPONENTS

Resistor, adjustable	0.5
(Includes adjust.)	
Resistor, fixed	0.2
Resistor, variable	0.3

4413 RECTIFIER COMPONENTS

Rectifier	0.5
-----------	-----

4415 HEAD, TORCH AND GUN UNITIZED COMPONENTS

Torch	0.4
Motor, wire feed	
Brushes, wire feed motor	0.8
(Motor removed.)	
Tube, contact	0.3
Nozzle and holder	0.1
Current body assembly	0.3
(Nozzle and holder removed.)	
Insulator, sleeve assembly	0.1
(Nozzle and holder removed.)	
Pressure roll assembly	0.2
Guide, inlet and outlet (ea)	0.4
Feed roll assembly	0.3
Motor housing	1.5
Spool inclosure assembly	0.2
Housing, front	0.8
Handle	0.2

47 GAGES

4702 GAGE	
Gage, argon	0.2
4705 FLOWMETERS AND REGULATORS	
Regulator	0.2
Tube flowmeter	0.5
"O" ring flowmeter	0.1

Section III. SPECIAL TOOLS AND EQUIPMENT

90. Special Tools and Equipment

No special tools or equipment are required by field and depot maintenance personnel for the maintenance of the welding set.

91. Field and Depot Maintenance Repair Parts

Field and depot maintenance repair parts

are listed and illustrated in TM 5-3431-208-25P.

92. Specially Designed Tools and Equipment

No specially designed tools or equipment are required by field and depot maintenance personnel for the maintenance of the welding set.

Section IV. TROUBLESHOOTING

93. General

This section provides information useful in diagnosing and correcting unsatisfactorily operation or failure of the welding set or any of its components. Each trouble symptom stated is followed by a list of probable causes of trouble. The possible remedy recommended is described opposite the probable cause.

94. Welding Wire Will Not Feed or Feeds too Slow

<i>Probable cause</i>	<i>Expedient remedy</i>
Feed motor brushes worn or defective.	Replace brushes (par. 97)
Feed motor defective.....	Replace motor (par. 97).

Section V. WIRE FEED MOTOR, MOTOR HOUSING, HANDLE ASSEMBLY, AND CONTROL CABINET MAINTENANCE INSTRUCTIONS

95. General

This section provides information necessary to perform maintenance on the wire feed motor. The wire feed motor is a permanent-magnet type. It is mounted beneath the motor housing and encased by the handle assembly. All maintenance performed on the motor should be performed on a clean, well-lighted workbench, since the smallest amount of foreign matter will damage the motor. When working on the feed motor, care must be taken to avoid removal of the armature from the frame. Even partial removal will cause the armature to be demagnetized, rendering the motor incapable of operation until magnetism is restored.

96. Handle Assembly

a. Removal.

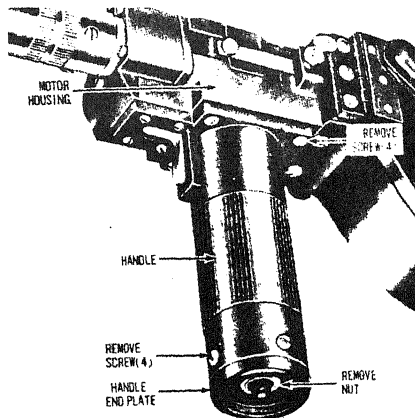
- (1) Remove the handle boot (par. 73).
- (2) Refer to figure 28 and remove the handle assembly.

b. Cleaning and Inspection.

- (1) Clean the handle assembly with a cloth dampened in an approved cleaning solvent and dry thoroughly.
- (2) Inspect the handle and end plate for cracks, breaks, and other damage.
- (3) Replace a defective handle assembly.

c. Installation.

- (1) Refer to figure 28 and install the handle assembly.
- (2) Install the handle boot (par. 73).



NOTE: PULL HANDLE STRAIGHT DOWN TO REMOVE.

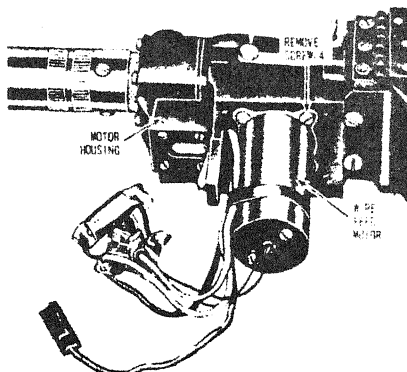
MSC 3431-208-15/28

Figure 28. Handle assembly, removal and installation.

97. Wire Feed Motor

a. Removal.

- (1) Remove the feed roll (par. 32).



NOTE: TAG AND DISCONNECT ELECTRICAL LEADS AS NECESSARY

MSC 3431-208-15/29

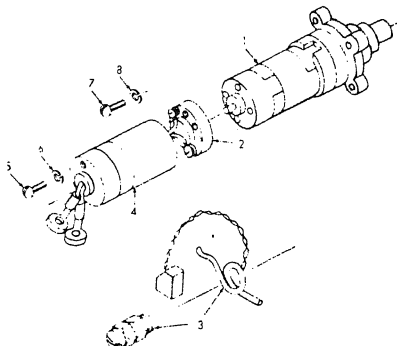
Figure 29. Wire feed motor, removal and installation.

- (2) Remove the handle assembly (par. 96).
- (3) Refer to figure 29 and remove the wire feed motor.

b. Disassembly. Refer to figure 30 and disassemble the wire feed motor.

c. Cleaning, Inspection, and Repair.

- (1) Wipe the motor free of dirt and grease with a clean, lint-free cloth dampened in approved cleaning solvent and dry thoroughly.
- (2) Inspect the brushes for cracks, chips, damaged electrical lead, and wear. If the brushes are worn one-half their original length, they should be replaced.
- (3) Inspect all parts for cracks, breaks, defective wiring insulation, and damage due to overheat.
- (4) Inspect the commutator surface for discoloration, wear, and pitting or burning.



MSC 3431-208-15/30

- 1 Wire feed motor
- 2 End bell
- 3 Brush, spring, and terminal assembly
- 4 Cover
- 5 Screw, machine, No. 4-40 x 3/4 in. (2 rqr)
- 6 Washer, lock, IT, 3/4 in. (2 rqr)
- 7 Screw, machine, No. 4-40 x 3/4 in. (2 rqr)
- 8 Washer, lock, No. 4 (2 rqr)

Figure 30. Wire feed motor, disassembly and reassembly.

Note. If the commutator is in such a condition as to require polishing or mica undercutting, it will be necessary to replace the motor since removal of the armature will cause the armature to lose its magnetism.

- (5) Replace a worn or defective brush assembly. Replace a defective motor.

d. Reassembly. Refer to figure 30 and reassemble the wire feed motor.

e. Testing. Use a source of 24 volts dc and test the feed motor for operation. Attach the red motor lead to the positive side of the power source and the black lead to the negative side. The motor should turn freely in a counter-clockwise direction, as viewed by the brush end of the motor.

f. Installation.

- (1) Refer to figure 29 and install the wire feed motor.
- (2) Install the handle assembly (par. 96).
- (3) Install the feed roll (par. 32).

98. Motor Housing

a. Removal.

- (1) Remove the pressure roll (par. 75).

- (2) Remove the welding gun front housing (par. 72).
- (3) Remove the wire feed motor (par. 97).
- (4) Remove the welding wire spool enclosure (par. 77).
- (5) Remove the trigger switch (par. 73).
- (6) Remove the trigger (par. 73).
- (7) Remove the drive roll contact shoe (par. 76).
- (8) Remove the inlet and outlet wire guides (par. 74).

b. Cleaning and Inspection.

- (1) Wash the motor housing in an approved cleaning solvent and dry thoroughly.
- (2) Inspect for cracks, breaks, wear, and damaged threads.
- (3) Replace a defective motor housing.

c. Installation.

- (1) Install the inlet and outlet wire guides (par. 74).
- (2) Install the drive roll contact shoe (par. 76).
- (3) Install the trigger (par. 73).
- (4) Install the trigger switch (par. 73).
- (5) Install the welding wire spool enclosure (par. 77).
- (6) Install the wire feed motor (par. 97).
- (7) Install the welding gun front housing (par. 72).
- (8) Install the pressure roll (par. 75).

99. Control Cabinet

a. Removal and Disassembly.

- (1) Remove the argon switch (par. 48).
- (2) Remove the welding control rheostat (par. 51).
- (3) Remove the auxiliary weld start relay (par. 53).
- (4) Remove the weld start relay (par. 52).
- (5) Remove the wire feed selector switch (par. 55).
- (6) Remove the fuse holders (par. 50).
- (7) Remove the overvoltage protective relay (par. 54).

- (8) Remove protection relay resistor (par. 58).
- (9) Remove the feed motor resistor (par. 57).
- (10) Remove the rectifier (par. 56).
- (11) Remove the line switch (par. 49).
- (12) Remove the voltage drop resistor (par. 59).
- (13) Remove the weld current relay (par. 62).
- (14) Remove the welding cable connector (par. 63).
- (15) Remove the argon gas solenoid valve (par. 45).
- (16) Remove the control assembly terminal board (par. 61).
- (17) Remove the spare fuse clip (par. 60).
- (18) Remove the electrical cables (par. 68).
- (19) Remove the strain relief connectors (par. 64).

b. Cleaning, Inspection, and Repair.

- (1) Wash the control cabinet in an approved cleaning solvent and dry thoroughly.
- (2) Inspect the cabinet for cracks, breaks, dents, and damaged or defective door fasteners and hinges.
- (3) Repair or replace a defective control cabinet.

c. Reassembly and Installation.

- (1) Install the strain relief connectors (par. 64).
- (2) Install electrical cables (par. 68).
- (3) Install the spare fuse clip (par. 60).
- (4) Install the control assembly terminal board (par. 61).
- (5) Install the argon gas solenoid valve (par. 45).
- (6) Install the welding cable connector (par. 63).
- (7) Install the weld current relay (par. 62).
- (8) Install the voltage drop resistor (par. 59).
- (9) Install the line switch (par. 49).
- (10) Install the rectifier (par. 56).

- (11) Install the feed motor resistor (par. 57).
- (12) Install the protection relay resistor (par. 58).
- (13) Install the overvoltage protection relay (par. 54).
- (14) Install the fuse holders (par. 50).
- (15) Install the wire feed selector switch (par. 55).
- (16) Install the weld start relay (par. 52).
- (17) Install the auxiliary weld start relay (par. 53).
- (18) Install the welding control rheostat (par. 51).
- (19) Install the argon switch (par. 48).

APPENDIX I

REFERENCES

1. Dictionaries of Terms and Abbreviations

- AR 320-5 Dictionary of United States Army Terms.
AR 320-50 Authorized Abbreviations and Brevity Codes.

2. Painting and Preservation

- TB ENG 60 Preservation of Painting of Serviceable Corps of Engineers Equipment.

3. Preventive Maintenance

- AR 750-5 Organization, Policies, and Responsibilities for Maintenance Operations.
TM 38-750 The Army Equipment Record System and Procedures.

4. Publication Indexes

- DA Pam 108-1 Index of Army Motion Pictures, Film Strips, Slides, and Phonorecordings.
DA Pam 310-1 Index of Administrative Publications.
DA Pam 310-2 Index of Blank Forms.
DA Pam 310-3 Index of Training Publications.
DA Pam 310-4 Index of Technical Manuals, Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Work Orders.
DA Pam 310-5 Index of Graphic Training Aids and Devices.
DA Pam 310-25 Index of Supply Manuals—Corps of Engineers.

5. Shipment and Limited Storage

- AR 743-505 Limited Storage of Corps of Engineers' Mechanical Equipment.
TM 38-230 Preservation, Packaging, and Packing of Military Supplies and Equipment.

6. Supply Publications

- SM 10-C-9100-SL Petroleum, Petroleum-Base Products, and Related Materiel.
TM 5-3431-208-25P Organizational, Field, and Depot Maintenance Repair Parts and Special Tool Lists. Welding Set, Arc, Inert Gas Shielded: Plastic or Metal Lined Gun: For $\frac{3}{4}$ in. Wire; Dc, 115 V (Linde Model SEM-9-A)
(When published) FSN 3431-972-7672.

7. Training Aids

- FM 21-5 Military Training.
FM 21-6 Techniques of Military Instruction.
FM 21-30 Military Symbols.

APPENDIX II

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

1. General

This appendix contains explanations of all maintenance and repair functions authorized the various echelons. Section II contains the maintenance allocation chart.

2. Maintenance

Maintenance is any action taken to keep materiel in a serviceable condition or to restore it to serviceability when it is unserviceable. Maintenance of materiel includes the following:

- a. *Service.* To clean, preserve, and replenish fuel and lubricants.
- b. *Adjust.* To regulate periodically to prevent malfunction.
- c. *Inspect.* To verify serviceability and detect incipient electrical or mechanical failure by scrutiny.
- d. *Test.* To verify serviceability and detect incipient electrical or mechanical failure by use of special equipment such as gages, meters, and the like.
- e. *Replace.* To substitute serviceable assemblies, subassemblies, and parts for unserviceable components.
- f. *Repair.* To restore an item to serviceable condition through correction of a specific failure or unserviceable condition. This function includes, but is not limited to, inspecting, cleaning, preserving, adjusting, replacing, welding, riveting, and straightening.
- g. *Aline.* To adjust two or more components of an electrical system so that their functions are properly synchronized.
- h. *Calibrate.* To determine, check, or rectify the graduation of an instrument, weapon, or

weapons system, or components of a weapons system.

i. *Overhaul.* To restore an item to completely serviceable condition as prescribed by serviceability standards developed and published by heads of technical services. This is accomplished through employment of the technique of "Inspect and Repair Only as Necessary" (IROAN). Maximum utilization of diagnostic and test equipment is combined with minimum disassembly of the item during the overhaul process.

3. Explanation of Columns

- a. *Functional Group.* The functional group is a numerical group set up on a functional basis. The applicable functional grouping indexes (obtained from the Corps of Engineers Functional Grouping Indexes) are listed in the maintenance allocation chart in the appropriate numerical sequence. These indexes normally are set up in accordance with their function and proximity to each other.
- b. *Components and Related Operation.* This column contains the functional grouping index heading, subgroup headings, and a brief description of the part, starting with the noun name. It also designates the operations to be performed, such as service, adjust, inspect, test, replace, repair, and overhaul.
- c. *Echelons of Maintenance.* This column contains the various echelons of maintenance by number designation. An X placed in the appropriate echelon column in line with an indicated maintenance function authorizes that echelon to perform the function. The X indicates the lowest echelon responsible for per-

forming the function, but does not necessarily indicate repair parts stockage at that level. Higher echelons are authorized to perform the indicated functions of lower echelons.

d. Remarks. This column lists specific maintenance functions, special tools, cross-references, instructions, and the like pertinent to the operation being performed.

Maintenance Allocation Chart

Functional group	Components and related operation	Echelons of maintenance					Remarks
		1	2	3	4	5	
22	Miscellaneous Body, Chassis or Hull, and Accessory Items.						
2210	Data plates.						
	Plates, identification:						
	Replace		X				
	Plate, identification (C.O.E.):						
	Replace			X			
26	Accessories.						
2602	Accessories.						
	Hose assembly, argon:						
	Replace		X				
44	Welding Equipment.						
4400	Arc welding set.						
	Welder assembly, arc:						
	Service		X				
	Inspect		X				
	Test			X			
	Replace			X			
	Repair			X			
	Overhaul					X	
4407	Control panels.						
	Control assembly, voltage:						
	Replace			X			
	Repair			X			
	Gasket, cabinet:						
	Replace			X			
	Wire, electrical:						
	Replace			X			Fabricate.
	Cabinet, control:						
	Replace			X			
4408	Connecting devices.						
	Terminal board, contactor:						
	Replace			X			
	Box connector, torch cable:						
	Replace			X			
	Cable assembly, contactor:						
	Replace			X			
	Cable assembly, welding:						
	Replace			X			
	Hose assembly, argon gas:						
	Replace			X			
	Cable assembly, torch, grounding and power:						
	Replace			X			

Functional group	Components and related operation	Echelons of maintenance					Remarks
		1	2	3	4	5	
4409	Protective devices, electrical.						
	Fuse, cartridge:						
	Replace.....		X				
	Fuse holder:						
	Replace.....		X				
4410	Switching, timing, and speed control.						
	Contactor assembly:						
	Replace.....		X				
	Repair.....		X				
	Contactor:						
	Replace.....		X				
	Repair.....		X				
	Points, contact:						
	Replace.....		X				
	Valve solenoid, gas:						
	Test.....		X				
	Replace.....		X				
	Coil, magnet:						
	Replace.....		X				
	Switch, toggle, Main line:						
	Replace.....		X				
	Switch, toggle, power:						
	Replace.....		X				
	Cabinet, contactor:						
	Replace.....		X				
	Switch, toggle, argon:						
	Replace.....		X				
	Relays, armature and current:						
	Test.....		X				
	Replace.....		X				
	Switch, sensitive, trigger:						
	Replace.....		X				
	Switch, fuse: inch:						
	Replace.....		X				
	Capacitor:						
	Test.....		X				
	Replace.....		X				
4411	Resistor components.						
	Resistor, adjustable:						
	Adjust.....		X				
	Test.....		X				
	Replace.....		X				
	Resistor, fixed:						
	Test.....		X				
	Replace.....		X				
	Resistor variable (R3):						
	Test.....		X				
	Replace.....		X				
4413	Rectifier components.						
	Rectifier:						
	Test.....		X				
	Replace.....		X				

Functional group	Components and related operation	Echelons of maintenance					Remarks
		1	2	3	4	5	
4415	Head, torch, and gun unitized components.						
	Torch assembly:						
	Service.....	X					
	Replace.....		X				
	Repair.....		X				
	Motor, direct current, wire feed:						
	Replace.....			X			
	Repair.....			X			
	Overhaul.....					X	
	Parts kit, wire feed motor:						
	Replace.....			X			
	Tube, wire guide:						
	Replace.....		X				
	Nozzle assembly:						
	Service.....	X					Clean nozzle.
	Replace.....		X				
	Current body assembly:						
	Replace.....		X				
	Insulator sleeve assembly:						
	Replace.....		X				
	Pressure roll assembly:						
	Replace.....		X				
	Guide, inlet and outlet:						
	Replace.....		X				
	Feed roll assembly:						
	Service.....	X					
	Replace.....		X				
	Housing, motor:						
	Replace.....			X			
	Cover assembly, spool enclosure:						
	Replace.....		X				
	Handle, torch:						
	Replace.....			X			
	Housing, front:						
	Replace.....		X				
47	Gages.						
4702	Gage.						
	Gage, argon:						
	Replace.....		X				
4705	Flow meters and regulators.						
	Regulator:						
	Replace.....		X				
	Repair.....			X			
	Overhaul.....					X	
	Tube, flow meter:						
	Replace.....		X				
	"O" ring, flow meter:						
	Replace.....		X				

APPENDIX III

BASIC ISSUE ITEMS LIST AND MAINTENANCE AND OPERATING SUPPLIES

Section I. INTRODUCTION

1. General

Section II lists the accessories, tools, and publications required in 1st echelon maintenance and operation, initially issued with, or authorized for the welding set. Section III lists the maintenance and operating supplies required for initial operation.

2. Explanation of Columns in Section II

a. *Source Codes.* The information provided in each column is as follows:

- (1) *Technical service.* This column lists the basic number (or symbol) of the technical service assigned supply responsibility for the part. Blank spaces denote Corps of Engineers supply responsibility. General Engineer supply parts are identified by the letters "GE" in parentheses, following the nomenclature in the description column. Other technical services basic numbers (or symbols) are—

10—Quartermaster Corps

12—Adjutant General's Corps

- (2) *Source.* The selection status and source of supply for each part are indicated by one of the following code symbols:

- (a) P—applied to high-mortality repair parts which are stocked in or supplied from the technical service depot system, and authorized for use at indicated maintenance echelons.
- (b) P1—applied to repair parts which are low-mortality parts, stocked in or supplied from technical service

depots, and authorized for installation at indicated maintenance echelons.

- (c) M—applied to repair parts which are not procured or stocked but are to be manufactured at indicated maintenance echelons.
- (d) X2—applied to repair parts which are not stocked. The indicated maintenance echelon requiring such repair parts will attempt to obtain them through cannibalization; if not obtainable through cannibalization, such repair parts will be requisitioned with supporting justification through normal supply channels.

- (2) *Maintenance.* The lowest maintenance echelon authorized to use, stock, install, or manufacture the part is indicated by the following code symbol:

O—Organizational Maintenance
(1st and 2d Echelon)

- (4) *Recoverability.* Repair parts and/or tool and equipment items that are recoverable are indicated by one of the following code symbols:

- (a) R—applied to repair parts and assemblies which are economically repairable at field maintenance facilities (3d and 4th echelons) and normally are furnished by supply on an exchange basis.
- (b) T—applied to high-dollar value recoverable repair parts which are subject to special handling and are issued on an exchange basis. Such

repair parts normally are repaired or overhauled at depot maintenance facilities.

- (c) U—applied to repair parts specifically selected for salvage by reclamation units because of precious metal content, critical materials, high-dollar value reusable casings, castings, and the like.

Note. When no code is shown in the recoverability column = the part is considered expendable.

b. *Federal Stock Numbers.* When a Federal stock number is available for a part, it will be shown in this column, and used for requisitioning purposes.

c. *Description.*

- (1) The item name and a brief description of the part are shown.
- (2) A five-digit Federal supply code for manufacturers and/or other technical services is shown in parentheses followed by the manufacturer's part number. This number will be used for requisitioning purposes when no Federal stock number is indicated in the Federal stock number column.

Example: (08645) 86453

- (3) The letters "GE", shown in parentheses immediately following the description, indicate General Engineer supply responsibility for the part.

d. *Unit of Issue.* If no abbreviation is shown in this column, the unit of issue is each.

e. *Quantity Authorized.* This column lists the quantities of repair parts, accessories, tools, or publications authorized for issue to the equipment operator or crew as required.

f. *Quantity Issued with Equipment.* This column lists the quantities of repair parts, accessories, tools, or publications that are initially issued with each item of equipment. Those indicated by an asterisk are to be requisitioned through normal supply channels as required.

g. *Illustrations.* This column is subdivided into two columns.

- (1) *Figure number.* Provides the identifying number of the illustration.

- (2) *Item number.* Provides the referenced number for the parts shown in the illustration.

3. Explanation of Columns in Section II

a. *Item.* This column contains numerical sequenced item numbers, assigned to each component application, to facilitate reference.

b. *Component Application.* This column identifies the component application of each maintenance or operating supply item.

c. *Source of Supply.* This column lists the basic number of the technical service assigned supply responsibility for the item. Those spaces left blank denote Corps of Engineers supply responsibility. Other technical services basic numbers are —

3—Chemical Corps

Note. Include only the applicable technical services.

d. *Federal Stock Number.* When a Federal stock number is available it will be shown in this column and will be used for requisitioning purposes.

e. *Description.* The item name and a brief description are shown.

f. *Quantity Required for Initial Operation.* This column lists the quantity of each maintenance or operating supply item required for initial operation of the equipment.

g. *Quantity Required for 8 Hours Operation.* Quantities listed represent the estimated requirements for an average eight hours of operation.

h. *Notes.* This column contains informative notes keyed to data appearing in the preceding columns.

4. Columns and Suggestions

Suggestions and recommendations for changes to the basic issue items list and/or maintenance and operating supplies table will be submitted on DA Form 2028 to the Commanding Officer, U. S. Army Mobility Support Center, ATTN: SMOMS-MS, P. O. Box 119, Columbus 16, Ohio, Direct communication is authorized.

Section II. BASIC ISSUE ITEM LIST

Source codes				Federal stock No.	Description	Unit of issue	Expendability	Quantity authorized	Quantity issued with equipment	Illustrations							
Technical service	Source	Maintenance level	Recoverability							Fig.	Item						
GROUP 26—ACCESSORIES																	
PUBLICATIONS, TEST																	
EQUIPMENT AND TOOLS																	
2602—ACCESSORIES																	
10	P	O	----	7520-559-9618	CASE, MAINTENANCE AND OPERATIONAL MANUALS: cotton-duck, water repellent and mildew resistant.	----	----	1	1								
	P1	O	----	3431-981-1036	HOSE ASSEMBLY: argon, 10 ft lg (36346) 521078.	----	----	1	1								
	P	O	----	3431-981-1037	WIRE: aluminum, 3/4 in. dia.	RL	----	20	20								
	P1	O	----	8120-862-6671	ADAPTER: argon hose to tank.	----	----	1	*								
2603—COMMON TOOLS																	
10	P	O	----	5120-223-7397	PLIERS, SLIPJOINT: straight hose, comb, w/cutter, 8 in. lg.	----	----	1	*								
10	P	O	----	5120-277-9491	SCREWDRIVER, FLAT TIP: wood handle, flared tip 1/4 in. w, 4 in. lg blade.	----	----	1	*								
10	P	O	----	5120-264-3796	WRENCH, OPEN END ADJUST-ABLE: single head, 0 to 1 1/2 in. jaw opening, 12 in. lg.	----	----	1	*								
2605—PUBLICATIONS																	
12	----	----	----		Department of the Army Operator, Organizational, Field, and Depot Maintenance Manual TM 5-3431-208-I5.	----	----	2	2								
12	----	----	----		Department of the Army Organizational, Field and Depot Maintenance Repair Parts and Special Tool Lists, TM 5-3431-208-25P.	----	----	2	2								
GROUP 44—																	
WELDING EQUIPMENT																	
4408—CONNECTING DEVICES																	
	P1	O	----	3431-018-3097	CABLE: welding, 6 ft lg (36346) 458716.	----	----	1	1								
	P1	O	----	3431-018-3098	CABLE: welding 12 1/2 ft lg (36346) 458717.	----	----	1	1								
	P1	O	----	3431-018-3096	CABLE: work pick up (36346) 458705.	----	----	1	1								
4409—PROTECTIVE DEVICES																	
ELECTRICAL																	
	P	O	----	5920-428-5725	FUSE: 1 amp (36346) 82W43.	----	----	4	4								
4415—HEAD, TORCH AND GUN UNITIZED COMPONENTS																	
	P	O	----	3431-893-3124	TUBE, CONTACT (38346) 48N53.	----	----	36	36								
	P	O	----	3431-977-5381	NOZZLE: metal, No. 10.	----	----	6	6								

Section III. MAINTENANCE AND OPERATING SUPPLIES

Item	Component application	Source of supply	Federal stock No.	Description	Quantity required for initial operation	Quantity required for 8 hours operation	Notes
80	STORAGE EQUIPMENT 8002 STORAGE CLYINDER	3	6830-290-4291	ARGON GAS: 243 cu ft cylinder.	1	As required	

INDEX

	Paragraph	Page		Paragraph	Page
Adjustment:			Handle assembly	96	45
Argon regulator	16a	10	Holders, fuse	50	27
Protection relay resistor	58e	29	Hose, valve-to-connector	44	23
Overvoltage protection relay	54e	28	Housing, motor	98	46
Voltage drop resistor	59e	30			
Weld current relay	62d	31	Inching switch, and motor capacitor,	73	35
Argon regulator, pressure gage, and	46	24	trigger, trigger switch		
flowmeter			Identification and tabulated data	4	4
Argon switch	48	25	Inlet and outlet wire guides	74	37
Auxiliary weld start relay	53	27	Inspecting and servicing equipment	8	5
			Installation of separately packed	9	5
Basic issue tools and equipment	26	14	components		
			Installation or setting-up instructions	10	5
Cables, electrical	68	33	Instruments, controls	14	8
Connector:			Insulator sleeve, current body,	72	34
Strain relief	64	32	contact tube, and front housing,		
Welding cable	63	31	nozzle and retainer		
Contact shoe, feed motor	76	38			
Contactor assembly terminal board	67	33	Line switch	49	27
Contactor cabinet	69	33			
Contactor, weld	65	32	Models, differences	5	4
Controls and instruments	14	8	Motor capacitor, trigger, trigger switch,	73	35
Control assembly terminal board	61	31	inching switch		
Control cabinet	99	47	Motor housing	98	46
Current body, contact tube, and	72	34	Motor, wire feed	97	45
front housing, nozzle and			Movement, dismantling	11	8
retainer, nozzle holder					
Daily preventive maintenance services	29	14	Nozzle and retainer, nozzle holder,	72	34
Demolition:			insulator sleeve, current body,		
Other methods	80	40	contact shoe, and front housing		
To render welding set inoperative	79	40	Operation:		
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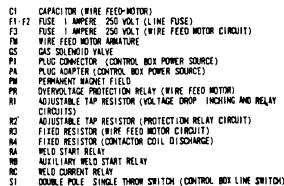
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NG: State AG (3).

USAR: Same as active Army except allowance is one copy to each unit.

For explanation of abbreviations used, see AR 320-50.



- Figure 27. Schematic of the**

The diagram is a complex electronic schematic for a radio receiver. It features several vacuum tubes: a 6X4 rectifier tube (VR), a 6AR5 pentode (RA), and a 6BE6 pentode (RB). The power supply section includes a transformer (T1) with primary taps for 115V and 230V, and secondary taps for 0-15V, 0-25V, and 0-100V. The rectifier (VR) is connected to the 0-100V tap. The filter capacitor (C10) is connected to the 0-25V tap. The tuning eye (VR) is connected to the 0-15V tap. The speaker (SR) is connected to the output of the 6BE6 tube (RB). The circuit includes various resistors (R1-SR, R1-RB-2, R2, R3, R4, R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, R15, R16, R17, R18, R19, R20, R21, R22, R23, R24, R25, R26, R27, R28, R29, R30, R31, R32, R33, R34, R35, R36, R37, R38, R39, R40, R41, R42, R43, R44, R45, R46, R47, R48, R49, R50, R51, R52, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R70, R71, R72, R73, R74, R75, R76, R77, R78, R79, R80, R81, R82, R83, R84, R85, R86, R87, R88, R89, R90, R91, R92, R93, R94, R95, R96, R97, R98, R99, R100) and capacitors (C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27, C28, C29, C30, C31, C32, C33, C34, C35, C36, C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47, C48, C49, C50, C51, C52, C53, C54, C55, C56, C57, C58, C59, C60, C61, C62, C63, C64, C65, C66, C67, C68, C69, C70, C71, C72, C73, C74, C75, C76, C77, C78, C79, C80, C81, C82, C83, C84, C85, C86, C87, C88, C89, C90, C91, C92, C93, C94, C95, C96, C97, C98, C99, C100). The circuit is labeled with component values and part numbers, and includes a 'MAN' and 'AUTO' switch for manual and automatic tuning.

WELDER CONTROL BOX

WELDER CONTACTOR BOX

WELDER

BK BK G

BK BK G

BK BK G